# 1． Maintenance

## 1-1.Maintenance Part Chart

| No | Name | Part Number | Part Using Hours （Unit hours） | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 2、000 | 4、000 | 6、000 | 8、000 | 10、000 | 12、000 |
| . | Tape Path Cleaning | | △Clean the Tape Path at each 500 hours | | | | | |
| 1 | Cylinder Unit | ＶＥＧ１４９８ | ● | ● | ● | ● | ● | ◎ |
| 2 | Cleaning Arm Unit | ＶＸＬ２９２４ | ● | ● | ● | ● | ● | ◎ |
| 3 | Pinch Arm Unit | ＶＸＬ２８３５ | | ●■ | | ●■ | | ◎ |
| 4 | S Reel Motor Unit | ＶＥＭ０６８６ | | | ● | | | ◎ |
| 5 | T Reel Motor Unit | ＶＥＭ０６８７ | | | ● | | | ◎ |
| 6 | Thrust Screw Unit | ＶＸＱ０５５６ | | | ●▲ | | | ◎ |
| 7 | Front Loading Unit | ＶＸＡ６０７０ | | | | | | ● |
| 8 | Mech. Chassis Unit | ＶＸＹ１４３１Ｚ１ | | | | | | ● |
| 9 | Fan Motor | ＶＲＦ０１９０ | Replace the Fan Motor at each 10,000 hours ***Operation Time*** | | | | | |

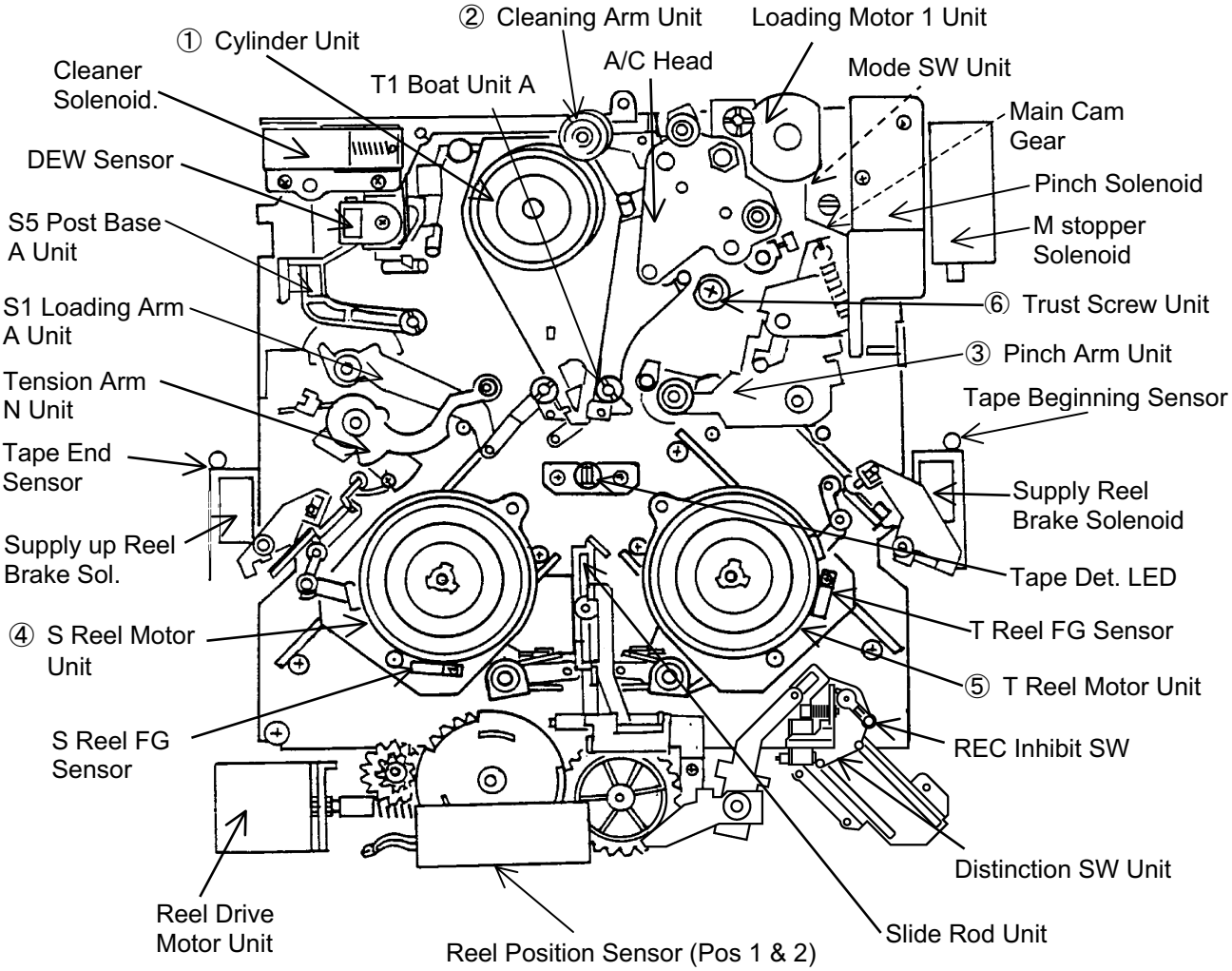
**Note:** Using hours are based on the head rotation hours.

Using hours are recommendation. It may depended on temperature, humidity or dusty.

Using hours are listed as the reference of maintenance. They do not mean guarantee Hours.

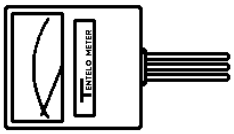
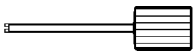
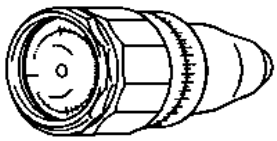
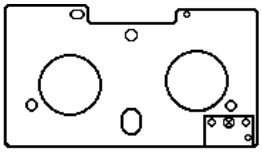
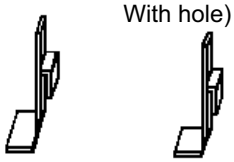
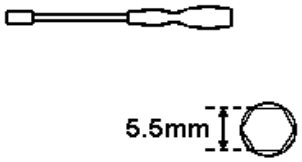
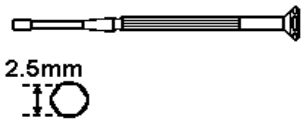
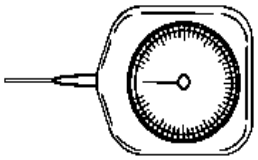
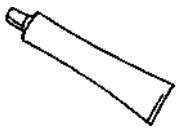
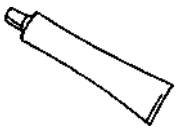
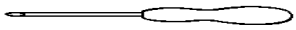
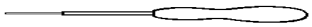
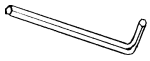
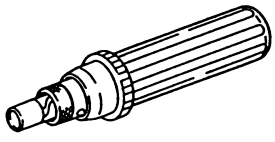
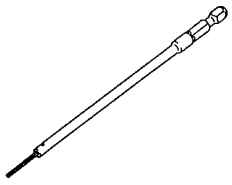
| Symbol | Maintenance | Remark |
|---|---|---|
| ● | Replacement | |
| ◎ | Replacement | These parts are included in Mech Chassis Unit |
| ■ | Greasing | Wipe the old grease and apply new grease |
| △ | Cleaning | This mark means cleaning is necessary |
| ▲ | Lubrication | The lubrication is necessary |

## 1-2. Sensors Layout

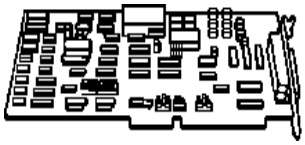


## 1-3. Servicing Fixtures & Tools

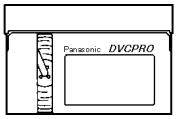
| No. | Part No. | Name | AJ-D850 | Remark |
|---|---|---|---|---|
| 1 | VFK1145 | Back Tension Meter (T2-M30-P) | ○ | |
| 2 | VFK1149 | Post Driver | ○ | |
| 3 | VFK71 | Dial Torque Gauge (150 g) | ○ | |
| 4 | VFK1191 | Dial Torque Gauge (45g) | ○ | |
| 5 | VFK1152 | Dial Torque Gauge Adapter | ○ | |
| 6 | VFK0357 | Eccentric Screwdriver (1.5) | ○ | |
| 7 | VFK1154 | Post Height Fixture | ○ | |
| 8 | VFK1153 | Mech. Neutral Plate(Post) | ○ | |
| 9 | VFK0906 | Oil | ○ | |
| 10 | VFK1155 | REV Position Tool (Silver color) | ○ | |
| 11 | VFK1156 | PLAY Position Tool (Black color) | ○ | |
| 12 | VFK1208 | Neutral Position tool (Black with hole) | ○ | |
| 13 | VFK1150 | Nut Driver (5.5mm) | ○ | |
| 14 | VFK1151 | Nut Driver (2.5mm) | ○ | |
| 15 | VFK1188 | Dial Tension Gauge (30g) | ○ | |
| 16 | VFK0948A | Check Light | ○ | |
| 17 | VFK0749 | Froiral Grease (White: for plastic part) | ○ | |
| 18 | M0R265 | Morlytone Grease (Black: for metal part) | ○ | |
| 19 | VFK1146 | Philips Driver (00-75) | ○ | |
| 20 | VFK1147 | Philips Driver (00-100) | ○ | |
| 21 | VFK1148 | Hex. Driver (1.5mm) | ○ | |
| 22 | VFK1178 | Hex. Driver (0.89mm) | ○ | |
| 23 | VFK1179 | Hex. Driver (0.71mm) | ○ | |
| 24 | VFK1190 | Hex. Wrench (1.5mm) | ○ | |
| 25 | VFK1209 | Torque Driver(0.4-3Kg) | ○ | |
| 26 | VFK1375 | Post Axis Driver(1.5mm) | ○ | or VFK0912 |
| 27 | VFK1300 | A/D Converter Board (DAQ-12 Quatech) | ○ | Purchase Locally |
| 28 | VFM3580KM | Alignment Tape (No.1) | ○ | for NTSC |
| 29 | VFM3581KM | Alignment Tape (No.2) | ○ | for NTSC |
| 30 | VFM3582KM | Alignment Tape (No.3) | ○ | |
| 31 | VFM3680KM | Alignment Tape (No.1) | ○ | for PAL |
| 32 | VFM3681KM | Alignment Tape (No.2) | ○ | for PAL |
| 33 | VFM3682KM | Alignment Tape (No.3) | ○ | for PAL |
| 34 | VFM3000EDS | Alignment Tape (DV LISTA) | ○ | |
| 35 | VFM3010EDS | Alignment Tape (DV Color Bar) | ○ | for NTSC |
| 36 | VFM3010EDS | Alignment Tape (DV Colour Bar) | ○ | for PAL |
| 37 | AJ-CL12MP | Cleaning Tape | ○ | |
| 38 | VFK1192 | Extension Board (F) | ○ | |
| 39 | VFK1193 | Extension Board (H) | ○ | |
| 40 | VFK1481 | LISTA Software | ○ | |
| 41 | VFK1186 | LISTA Cable | ○ | |
| 42 | VFK1160C | RF Adjustment Software | ○ | |
| 43 | VFK1163 | RF Adjustment Tape | ○ | |
| 44 | VFK1423 | Tape Det. Sensor Cassette | ○ | |
| 45 | VZZ0095 | Cleaning Cross | ○ | |
| 46 | VFK0369 | Tweezers | ○ | |
| 47 | VFK0371 | Radio Prier | ○ | |
| 48 | VFK0372 | Cutter Prier | ○ | |
| 49 | VFK0338 | Trimmer Adjustment Driver | ○ | |
| 50 | VFK0337 | Philips Driver | ○ | |

| | | | |
|---|---|---|---|
| 1 VFK1145<br>Back Tension Meter<br>  <br>Model:T2-M30-P | 2 VFK1149<br>Post Driver<br>  | 3 VFK71 (150g)<br>4 VFK1191(45g)<br>Dial Torque Gauge<br>  | 5 VFK1152<br>Dial Torque Gauge<br>Adapter<br> |
| 6 VFK0357($\phi$1.5)<br>Eccentric Screwdriver<br> | 7 VFK1154<br>Post Height Fixture<br> | 8 VFK1153<br>Mech Neutral Plate(Post)<br>  | 9 VFK0906<br>OIL<br>(for Thrust Adjustment screw) |
| 10 VFK1155 (REV, Silver)<br>11 VFK1156 (PLAY, Black)<br>12 VFK1208(Neutral,Black With hole)<br>  <br>(Gold) (Black) | 13 VFK1150<br>Nut Driver(5.5mm)<br>  <br>5.5mm | 14 VFK1151<br>Nut Driver(2.5mm)<br>  <br>2.5mm | 15 VFK1188(30g)<br>Dial Tension Gauge<br>  |
| 16 VFK0948A(or purchase locally)<br>Check Light<br> | 17 VFK0749<br>Froiral Grease(White)<br>(for plastic part)<br>  | 18 MOR265<br>Morlytone Grease(Black)<br>(for metal part)<br>  | 19 VFK1146 (00 x 75)<br>20 VFK1147 (00x 100)<br>Philips Driver<br>  |
| 21 VFK1148(1.5mm)<br>22 VFK1178(0.89mm)<br>23 VFK1179(0.71mm)<br>Hex. Driver<br>  | 24 VFK1190 (1.5mm)<br>Hex. Wrench<br>  | 25 VFK1209<br>Torque Driver(0.4-3Kg)<br>  | 26 VFK1375 or VFK0912<br>Post Axis Driver(1.5mm)<br>  |

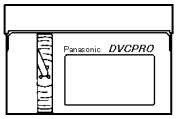
27 VFK1300
A/D Converter Board
(For Quatech. DAQ-12
Purchase Locally)



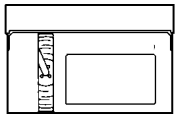
28 VFM3580KM
29 VFM3581KM
30 VFM3582KM
DVC PRO Alignment Tape
(for NTSC)



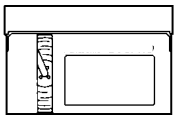

31 VFM3680KM
32 VFM3681KM
33 VFM3682KM
DVC PRO Alignment Tape
(for PAL)



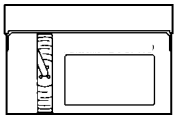

34 VFM3000EDS
DV Alignment Tape
(LISTA)



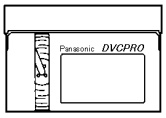
35 VFM3010EDS
DV Alignment Tape
(Color Bar)
(for NTSC)



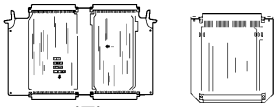
36 VFM3110EDS
DV Alignment Tape
(Colour Bar)
(for PAL)



37 AJ-CL12MP
Cleaning Tape

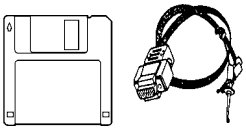



38 VFK1192 --- (F)
39 VFK1193 --- (H)
Extension Board

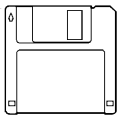


(F) (H)
Common for AJ-D750

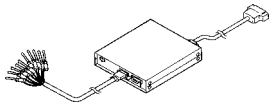
40 VFK1481
LISTA Software
41 VFK1186
LISTA Cable



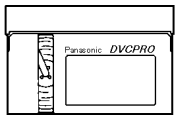
42 VFK1160C
RF Adjustment Soft



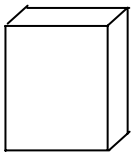
43 VFK1163
RF Adjustment Tool



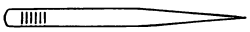
44 VFK1423
Tape Sensor
Cassette (M Cassette)



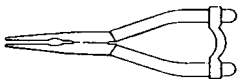

45 VZZ0095
Cleaning Cross



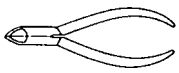
46 VFK0369
Tweezers



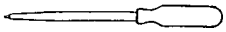
47 VFK0371
Radio Prier



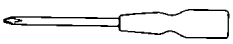
48 VFK0372
Cuntter Prier



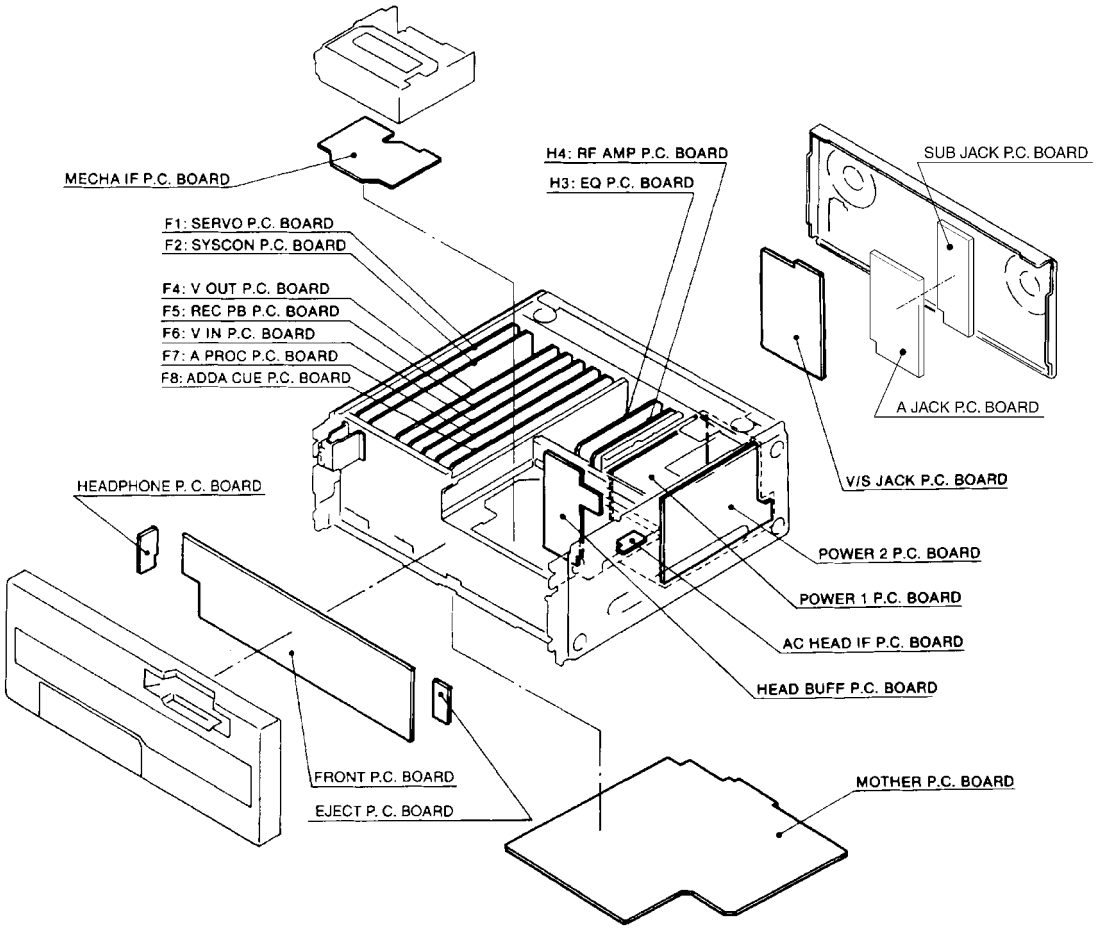
49 VFK0338
Trimmer Adjustment Driver



50 VFK0377
Philips Driver



# 1-4. Boards Location


MECHA IF P.C. BOARD
H4: RF AMP P.C. BOARD
H3: EQ P.C. BOARD
SUB JACK P.C. BOARD
F1: SERVO P.C. BOARD
F2: SYSCON P.C. BOARD
F4: V OUT P.C. BOARD
F5: REC PB P.C. BOARD
F6: V IN P.C. BOARD
F7: A PROC P.C. BOARD
F8: ADDA CUE P.C. BOARD
A JACK P.C. BOARD
V/S JACK P.C. BOARD
HEADPHONE P. C. BOARD
POWER 2 P.C. BOARD
POWER 1 P.C. BOARD
AC HEAD IF P.C. BOARD
HEAD BUFF P.C. BOARD
FRONT P.C. BOARD
EJECT P. C. BOARD
MOTHER P.C. BOARD

# 1-5. Alignment Tapes

## DVCPRO Alignment Tape

**VFM3580KM(NTSC)**

| Time | Video | | PCM | | CUE | |
|---|---|---|---|---|---|---|
| (min) | Signal | Purpose | Signal | Purpose | Signal | Purpose |
| 0:00 | Color Bar SMPTE(75%) | Composite Video Level Confirmation | 1kHz - 20dB | Audio Level Confirmation | 1kHz 0VU | CUE Level Confirmation |
| 7:00 | Color Bar Full Field(75%) | Component Video Level Confirmation | | | | |
| 14:00 | H Sweep | Frequency Response | | | 6kHz 0VU | A/C Head Azimuth |
| 18:00 | Bowtie(500k) | Y/C Timing | | | | |
| 22:00 | Pulse&Bar | Y/C Timing | | | -10dB, 1kHz 50Hz～15kHz | Frequency Response |
| 26:00 30:00 | Area Markers | | | | | |

**VFM3581KM(NTSC)**

| Time(min) | Signal |
|---|---|
| 0:00～20:00 | ITI Pattern |

**VFM3582KM(NTSC)**

| Time(min) | Signal |
|---|---|
| 0:00～10:00 | X Value |

**VFM3680KM (PAL)**

| Time | Video | | PCM | | CUE | |
|---|---|---|---|---|---|---|
| (min) | Signal | Purpose | Signal | Purpose | Signal | Purpose |
| 0:00 | Color Bar 100% | Video Level Confirmation | 1kHz -18dBu | Audio Level Confirmation | 1kHz Reference level | CUE Level Confirmation |
| 10:00 | H Sweep | Frequency Response | | | | |
| 14:00 | Area Markers | | | | 6kHz Reference level | A/C Head Azimuth |
| 18:00 | Bowtie(500k) | Y/C Timing | | | | |
| 22:00 | Pulse & Bar | Y/C Timing | | | 1kHz 300Hz~6kHz | Frequency Response |
| 26:00 30:00 | Multi Pulse | Y/C Timing | | | | |

**VFM3681KM (PAL)**

| Time (min) | Signal |
|---|---|
| 0:00 ~ 20:00 | ITI Pattern |

**VFM3682KM (PAL)**

| Time (min) | Signal |
|---|---|
| 0:00 ~ 10:00 | X Value |

## 1-6. Recommended Test And Service Equipment

**NTSC**

| Part No. | Name | Remark |
|---|---|---|
| TSG130A(OP.04) | Analog Component Signal Generator | TEKTRONIX |
| | Oscilloscope | |
| 1750,1760(OP.SC) or 1780R | WFM Monitor | TEKTRONIX |
| | Digital Volt Meter | |
| | Frequency Counter | |
| | VTVM | Frequency Band Width 4Hz-500KHz |
| | Audio Analyzer | |

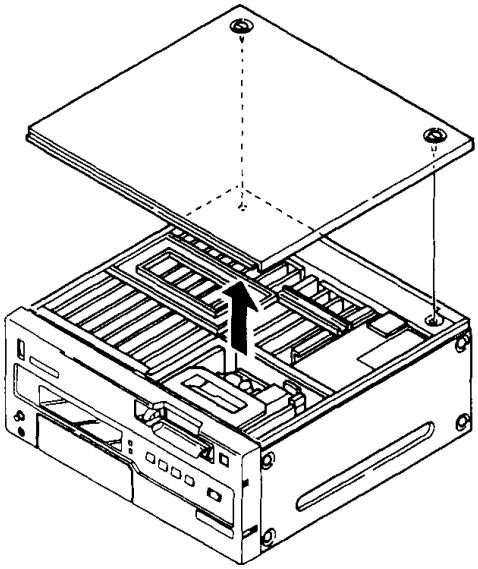
**PAL**

| Part No. | Name | Remark |
|---|---|---|
| TSG131A(OP.04) | Analog Component Signal Generator | TEKTRONIX |
| | Oscilloscope | |
| 1751,1761(OP.SC) or 1781R | WFM Monitor | TEKTRONIX |
| | Digital Volt Meter | |
| | Frequency Counter | |
| | VTVM | Frequency Band Width 4Hz-500KHz |
| | Audio Analyzer | |

# 2. Disassembly Method

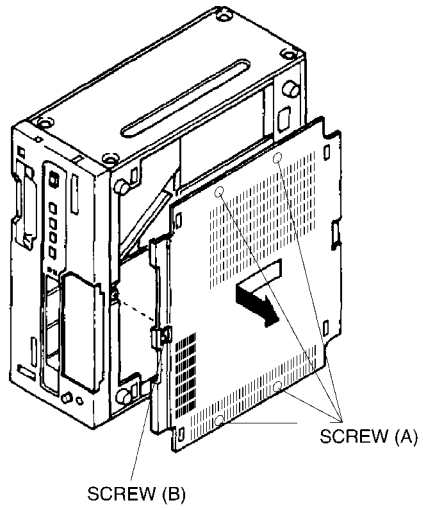
## 2-1. Removal of Top Panel

1. Loosen the two screws on the top panel.



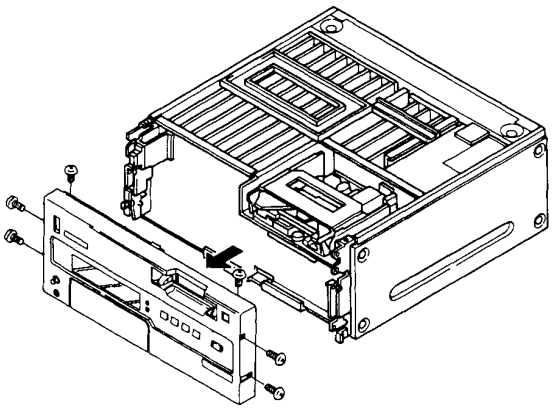
## 2-2. Removal of Bottom Panel

1. Unscrew the 4 screws (A) and loosen the screw (B).
2. Slide the bottom panel to front direction and remove the Bottom Panel.




## 2-3. Removal of Front Panel

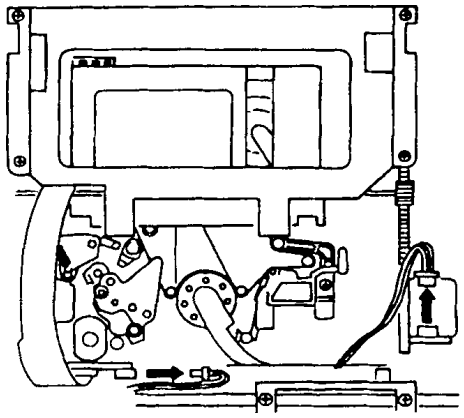
1. Remove the 4 screws at left and right.
2. Remove the 2 screws with Front Panel on the VTR top side.
3. Then draw it and remove the connector and remove the Front Panel.



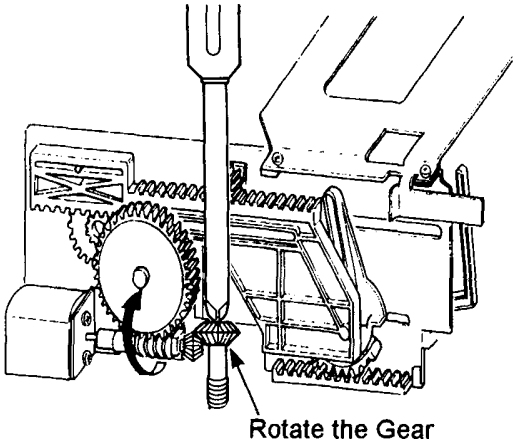
**Note:** After installation of Front Panel, confirm that the Blinder Panel is moved up and down smoothly by hand. If not, the Blinder Panel is caught by Blinder Panel Opener.

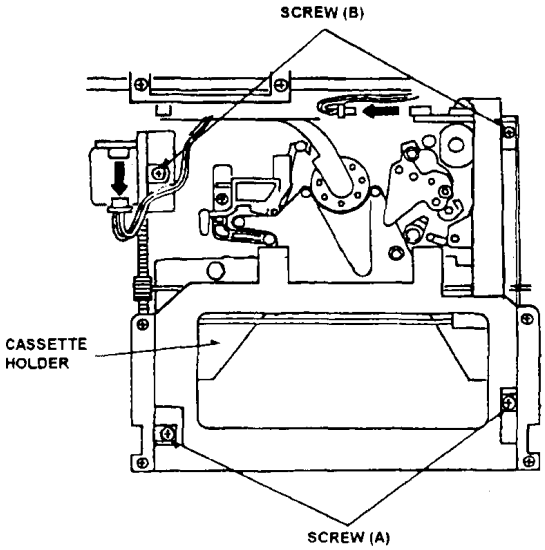
## 2-4. Removal of Front Loading Unit

1. Remove the 4 screws at left and right.part and the mechanism interconnection board.

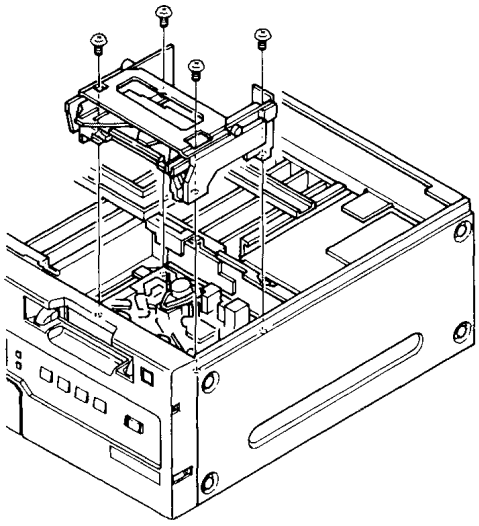


2. Rotate the red plastic screw in front of the worm gear of the cassette down motor counterclockwise by a Philips-head screw-driver pushing the screw to move the Cassette Holder unit the 2 screws (A) can be removal position.



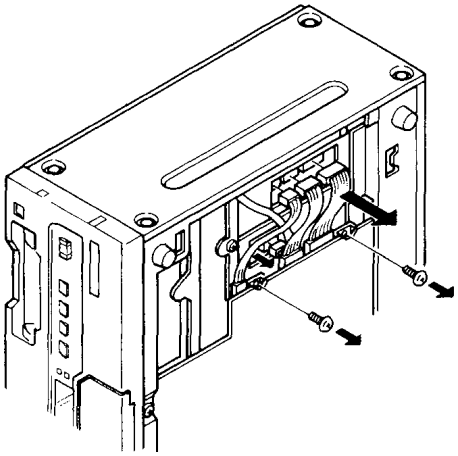




3. Unscrew the 4 screws (A) and (B), then remove the Front Loading Unit.

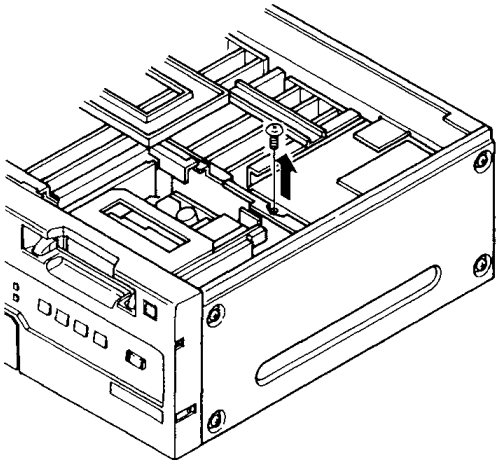


## 2-5. Removal of Power Supply Unit

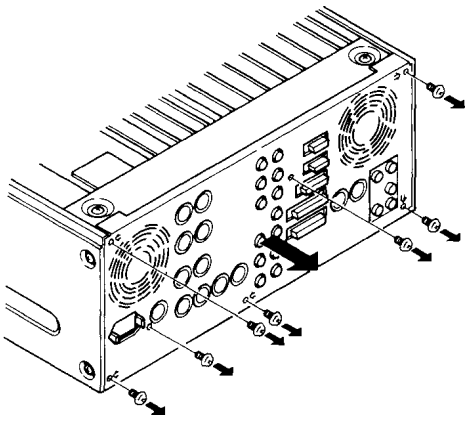
1. Remove 4 connectors with the Power Supply unit on the VTR bottom side.
2. Remove 2 screws with the Power Supply unit on the VTR bottom side.



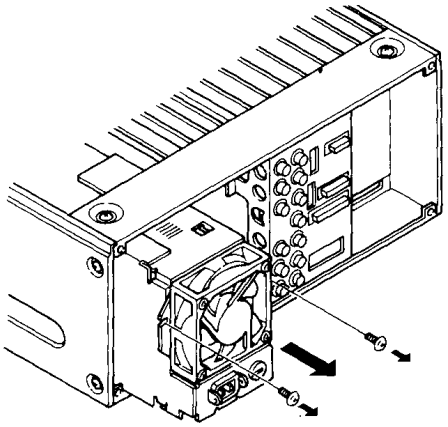
3. Remove one screw with the Power Supply unit on the VTR top side

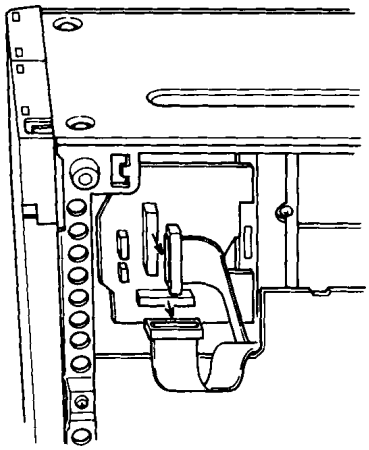


4. Remove the Rear Jack by removing 7 screws.



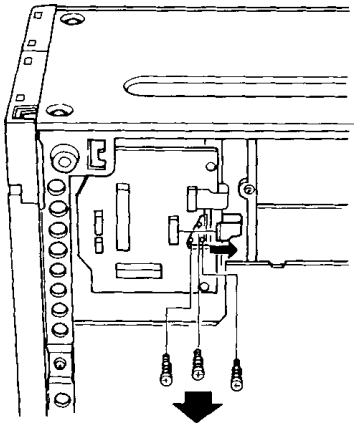
5. Remove 2 screws with the Power Supply unit on the VTR rear side.





## 2-6. Removal of Cylinder Unit

1. Disconnect the connector P33 on the Mech. I/F Board. And remove the 3 screws which have spring from the cylinder unit.

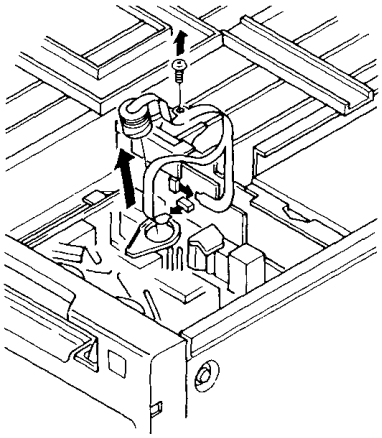


2. Remove the one screw which is fixed with the flexible cable. It attached Cylinder Unit.
3. Disconnect the connector P5003 and P5002 which are connected to Head Buffer board, then remove the cylinder unit without touching any mechanism parts.

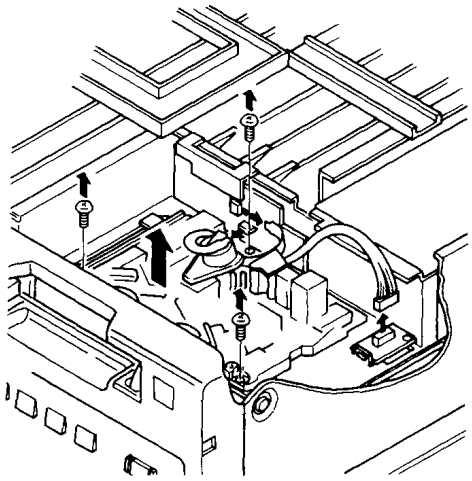
Assemble procedures reverse of the disassembly method.

## 2-7. Removal of Mechanism Unit

1. Remove the Front Loading unit.
2. Remove the Bottom Panel.
3. Disconnect the connector P1 and P2 on the Mech. I/F Board.
4. Disconnect the connector P1 on A/C Head I/F Board for remove the A/C Head cable.

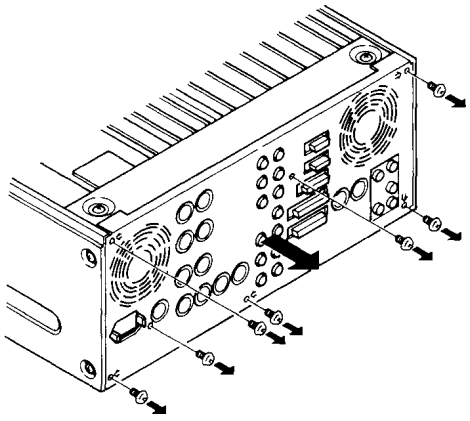


5. Disconnect the connector P5003 and P5002 on the Head Buffer board.
6. Unscrew the 3 screws and remove the mechanism unit.

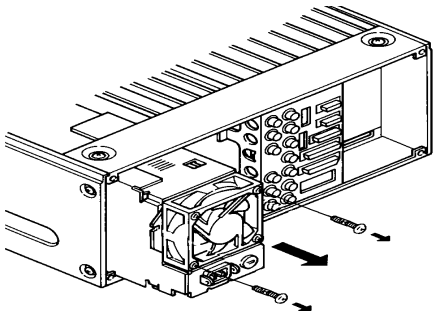


## 2-8. Removal of Fun Motor Unit

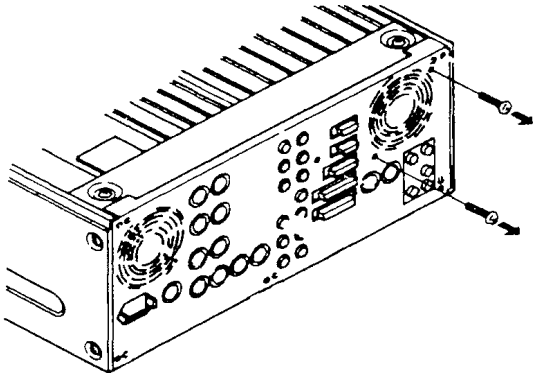
1. Remove the Rear Jack by removing 7 screws.



2. Unscrew the screws and disconnect the connector P14 on the Power 2 P.C.B., then remove the Fan Motor Unit.



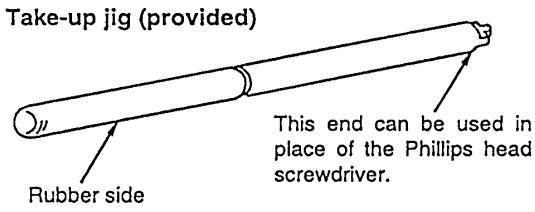
3. Unscrew the screws and disconnect the connector P032 on the Mother P.C.B., then remove the Fan Motor Unit.



## 3. Manual Tape Eject

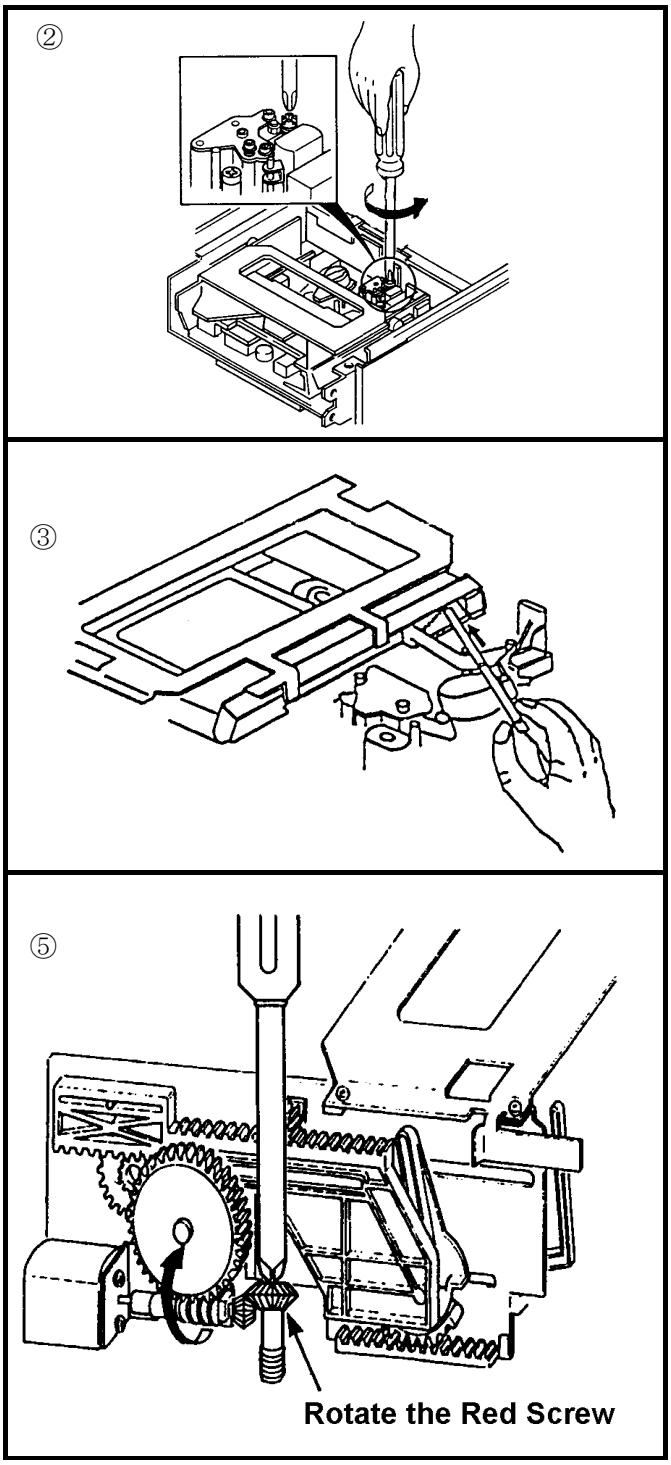
When a tape can not be ejected, because of Power failure or mechanical tape damage, remove the tape manually.

1. Turns power off and remove the top Case Unit.
2. Rotate the red plastic screw by a Phillips - head screwdriver counterclockwise pushing the screw. It needs to rotate about 30 times rotation until starting to move.
3. Since tape slack will develop when the post is unloaded, wind up the supply reel to take up the slack. How to take up the slack (see ③)
   a. Insert the rubber side of the take-up jig into the cassette tape withdrawal opening on the VTR's mechanism side.
   b. Turn the flange part of the supply reel in the direction of take-up to take up the tape slack. (Take care not to damage the tape in the process.)
4. Repeat item 2 and 3 until the tape in wound




Completely inside of the cassette.

5. When the tape is completely inside of the cassette, rotate the red screw in front of the worm gear of the cassette down motor clockwise by a Philips-head screwdriver pusing the screw and remove the cassette cover does not bite the tape when the cover is closed.



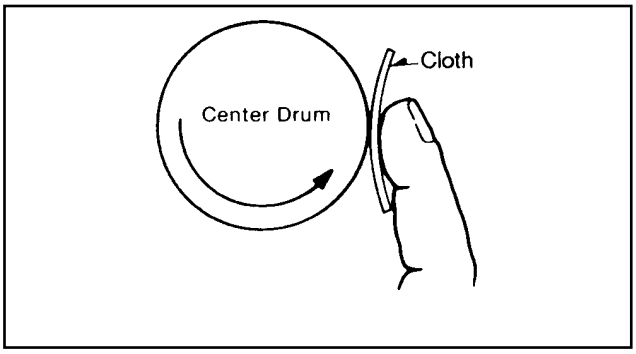
# 4. Cleaning Procedures

**Note:** Turns power off during cleaning.

Make sure the power is OFF before cleaning. Use ethanol(more than 99% purity) as cleaning liquid.

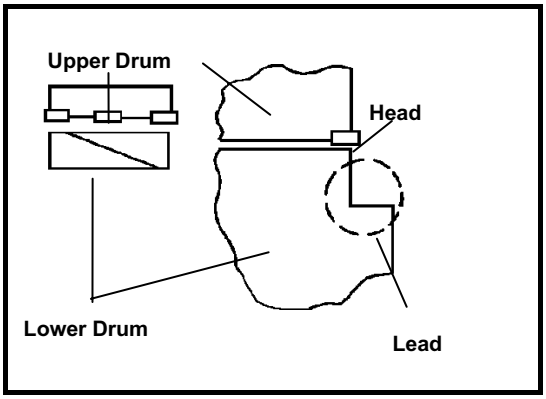
## 4-1 Cleaning of Head Chips: (Daily)

Clean heads by applying even pressure and rotating cylinder a few times. Never wipe in up and down motion. Never touch a cylinder by naked hand. First wipe with a cloth soaked by cleaning liquid. Then wipe with dry cloth.



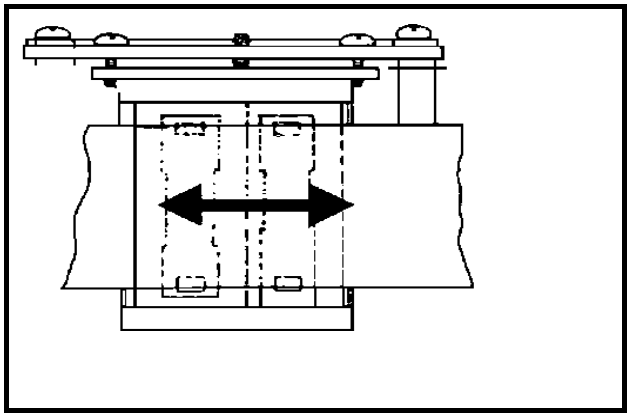

## 4-2. Cleaning of Drum Lead: (Weekly)

Be careful not to touch a head chip. Clean the drum lead with a pick.



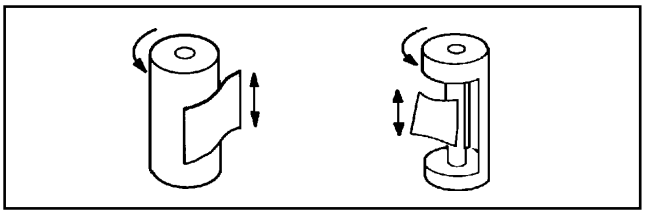

## 4-3. Cleaning of A/C Head: (Weekly)

Wipe the A/C head with a cloth soaked by cleaning liquid. Wipe again with a dry cloth.



## 4-4. Cleaning of Pinch Roller and Capstan: (Weekly)

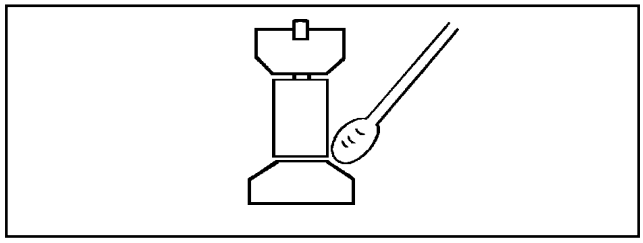
Wipe the Pinch Roller and Capstan with a cloth soaked by cleaning liquid.



## 4-5. Cleaning of Post :(Weekly)

Wind a cloth on a pick. Wipe each post dry with that pick . Wipe again with a dry cloth. For metal posts wipe with cleaning liquid. Then wipe dry again.

**Note:**



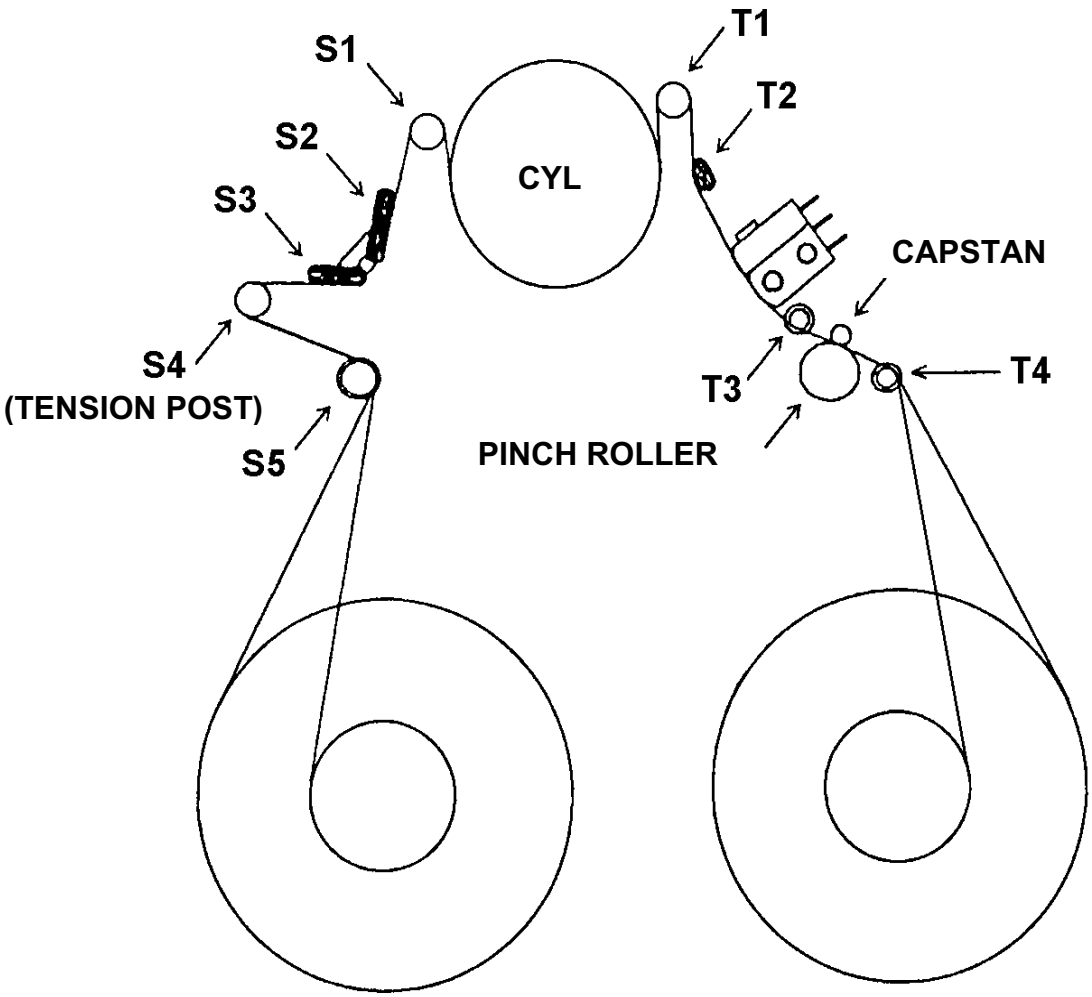
Use the clean cloth for cleaning purpose. Do not use any dirty cloth.

The Cleaning Cloth can be ordered as spare part. The part number indicated as below.

CLEANING CLOTH : VZZ0095

# 5. Mechanical Adjustment

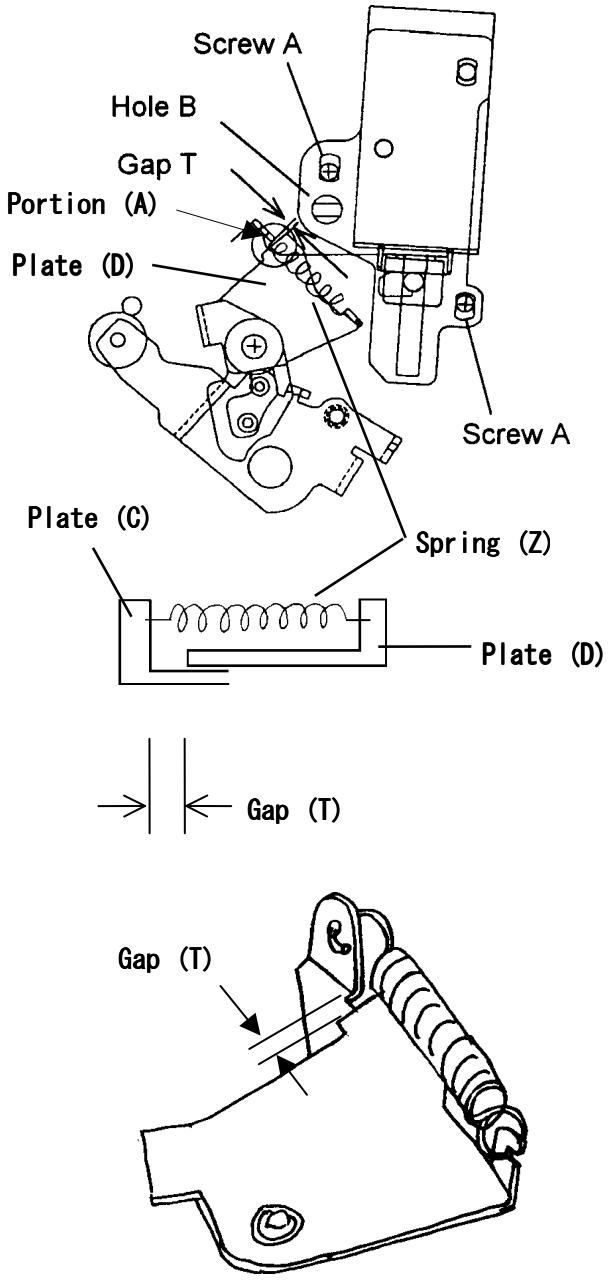
### 5-1. Name of tape transportation



## 5-2. Pinch Solenoid Position Adjustment

| | |
|---|---|
| **SPEC.** | T = 0.3mm |
| **TEST POINT** | Gap T |
| **ADJUSTME** | Screw(A), Hole(B) |
| **MODE** | EJECT（Power OFF） |
| **TOOL** | VFK0357(Eccentric Driver) |

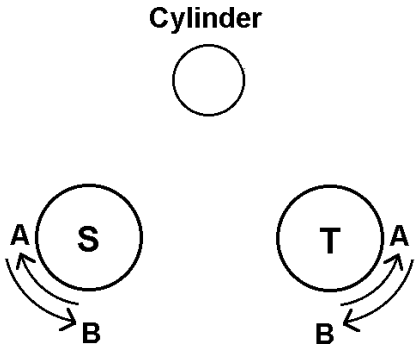
1. Confirm the power of condition at VTR.
2. Push the pinch roller by hand to be close to capstan.
3. Push the pinch solenoid by hand so that the pinch roller contacts capstan.
4. Loosen the two screws (A) and adjust the hole (B) by VFK0357 so that gap (T) is within specification.
5. The position for confirm Gap, which is located spring scratch to Plate (C) side.



## 5-3. Main Brake Torque Confirmation

| | |
|---|---|
| **SPEC** | Direction A : 40±20g·cm<br>Direction B : 20±15g·cm |
| **TEST POINT** | S reel、T Reel |
| **MODE** | EJECT（POWER OFF） |
| **TOOL** | VFK71(150g)、VFK1191(45g)、VFK1152 |

1. Remove the Cassette Up Unit.
2. Install the adapter(VFK1152) to the torque gauge (VFK71).
3. Put the torque gauge on S Reel and Turn the torque gauge to direction A until S Reel slips against brake.
4. Confirm the torque is within specification.
5. Put the torque gauge on T Reel and turn the torque gauge to direction A until T Reel slips against brake.
6. Confirm the torque is within specification
7. Install the adapter(VFK1152) to the torque gauge (VFK1191).
8. Put the torque gauge on S Reel and turn the torque gauge to direction B until S Reel slips against brake.
9. Confirm the torque is within specification.
10. Put the torque gauge on T Reel and turn the torque gauge to direction B until T Reel slips against brake.
11. Confirm the torque is within specification.



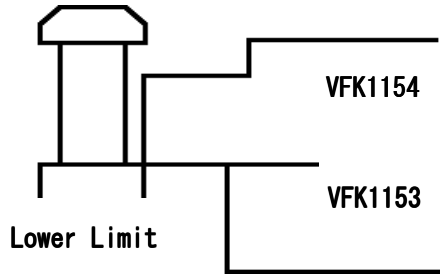
## 5-4. Post Height Pre-adjustment

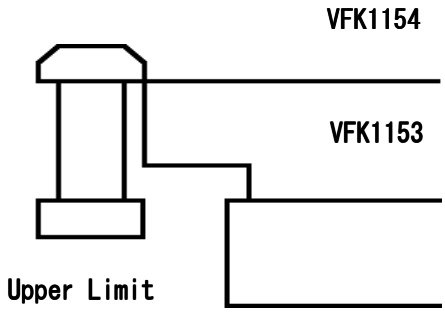
| | |
|---|---|
| **MODE** | EJECT（POWER OFF） |
| **TOOL** | VFK1153, VFK1154（Flange Tool） |

1. Confirm that the Reel Table is located at M Cassette position. If it is not located at M cassette position, turn power on and insert M cassette and eject it.
2. Turn power off and remove the Front Loading Unit. Install the Mech. Neutral Plate (VFK1153).
3. Place the flange tool(VFK1154) on Mech. Neutral Plate and adjust each post height as shown in figure.
4. Adjust the each post to Lower limit by VFK1154 as shown in figure.
5. VFK1149 use for Post height adjustment of S4 and S5 post. VFK1151 use for Post height adjustment of T3 and T4 post.

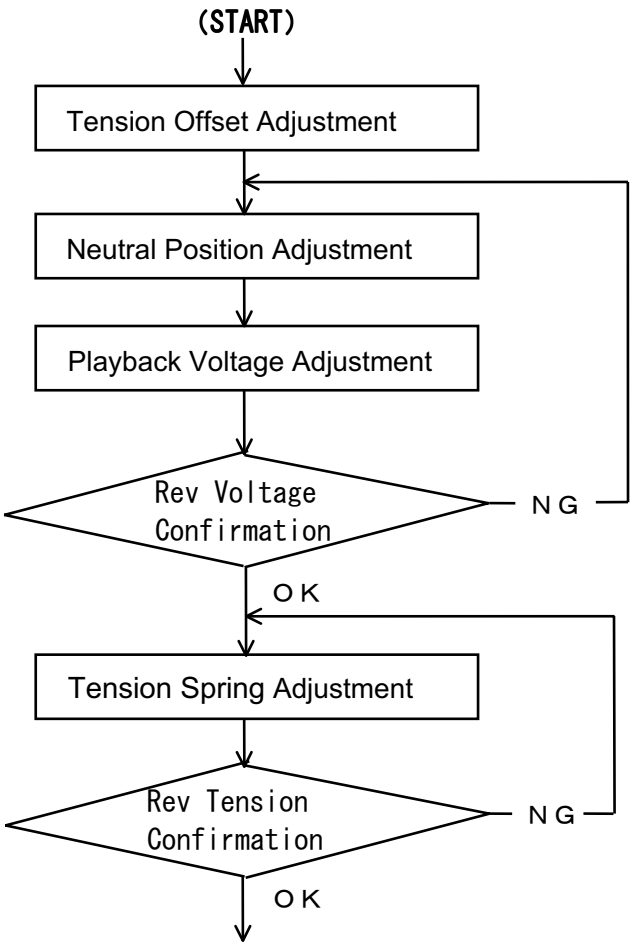
| Post | Limit | Post Driver |
|---|---|---|
| S5 Post | Lower* | VFK1149 |
| S4 Post | Lower* | VFK1149 |
| T3 Post | Lower | VFK1151(2.5mm Nut Driver) |
| T4 Post | Lower | VFK1151(2.5mm Nut Driver) |

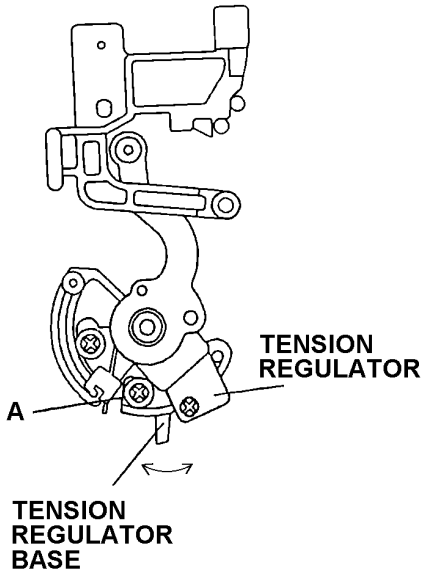
**Note: Lower*** : Turn S4 and S5 posts 1 round more counterclockwise from lower limit position.



## 5-5. Tension Adjustment Flowchart

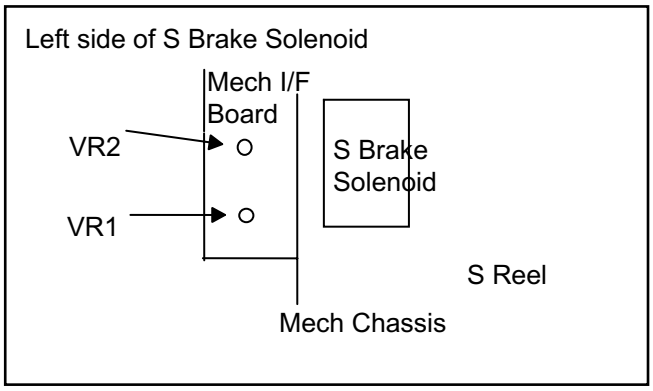


## 5-6. Tension Offset Adjustment

| | |
|---|---|
| **BOARD** | SERVO |
| **SPEC** | 2.5±0.05V |
| **TEST POINT** | TP201(SERVO:F1) |
| **ADJUSTMENT** | VR1(MECH I/F) |
| **MODE** | EJECT |
| **TOOL** | Digital Volt Meter |

1. Adjust the VR1 so that the DC voltage at TP201 is within specification.



## 5-7. Tension Arm Neutral Position Adjustment

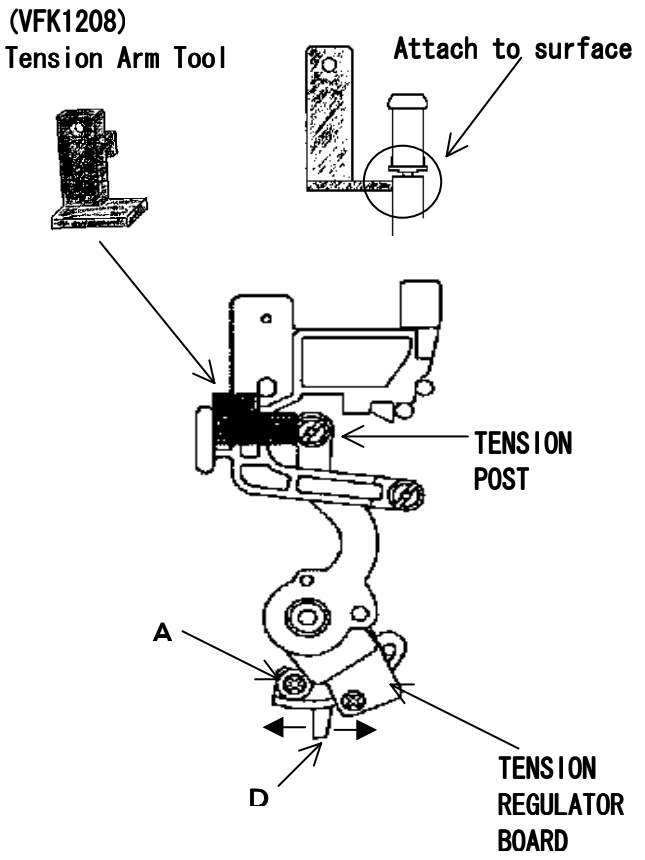
| | |
|---|---|
| **BOARD** | SERVO |
| **SPEC** | 2.5±0.1V |
| **TEST POINT** | TP201(SERVO:F1) |
| **ADJUSTMENT** | Base position of Tension Regulator Board |
| **MODE** | STOP |
| **TOOL** | Digital Volt Meter<br>VFK1208 (Black with hole) |

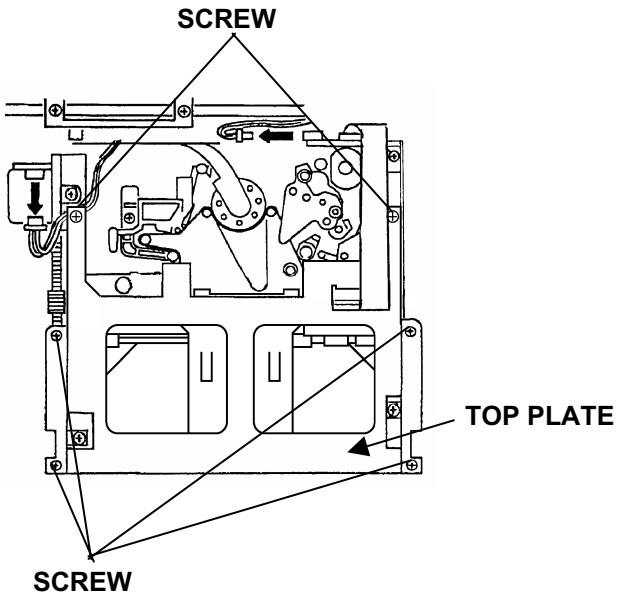
1. Unscrew the 2 screws and remove the Carriage Support Panel on the Front Loading Unit.
2. Disconnect the connector P3 on the Carriage Board of the Front Loading Unit..
3. Unscrew the 6 screws and remove the Top Plate on the Front Loading Unit.
4. Install the VFK1208(black with hole) as shown in figure
5. Connect the Digital Volt Meter to Test point.
6. Place the unit into the no tape loading mode(Refer to No tape loading mode procedure as mentioned as below.
7. Loosen the screw (A) and move the lever (D) with tweezers for adjust the sensor position so that the DC voltage at TP201 is within specification.

**[ No tape loading procedures ]**

Open the SERVO ADJUST menu on the Service Menu. Select the “A02:T REEL TRQ” by cursor key (▼、▲)and press STOP button on the Front Panel, then loading is started. During adjustment, hold the STOP button.

CAUTION: 1. Do not use magnetized tweezers and Screw driver.
2. Do not touch the magnetize Screw driver to S-Reel FG magnet portion, when the lever (D) portion is adjusting.

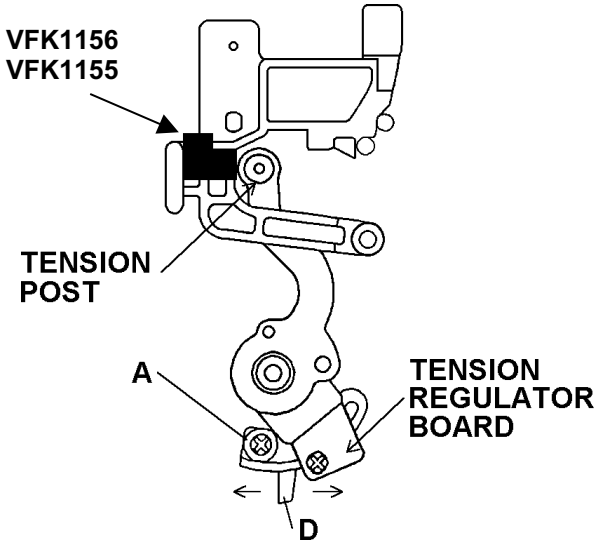


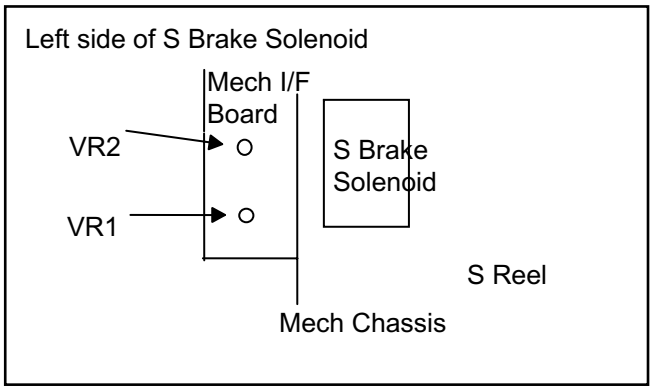



## 5-8. Tension Arm PLAY and REV voltage adjustment

| | |
|---|---|
| **BOARD** | SERVO |
| **SPEC** | (PLAY) 3.8±0.05V<br>(REV) 1.2±0.3V |
| **TEST POINT** | TP201(SERVO:F1) |
| **ADJUSTMENT** | VR2(Mech I/F) |
| **MODE** | STOP |
| **TOOL** | Digital Volt Meter<br>VFK1156(Black: for PLAY position)<br>VFK1155(Silver: for REV position) |

1. Install the VFK1156(black) as shown in figure.
2. Connect the Digital Volt Meter to Test point.
3. Place the unit into no tape loading mode.
4. Adjust the VR2 so that the DC voltage at TP201 is within specification (PLAY).
5. Install the VFK1155 as shown in figure and confirm that the DC voltage at TP201 is within specification (REV).
6. If it out of spec, perform the Neutral Position adjustment again.

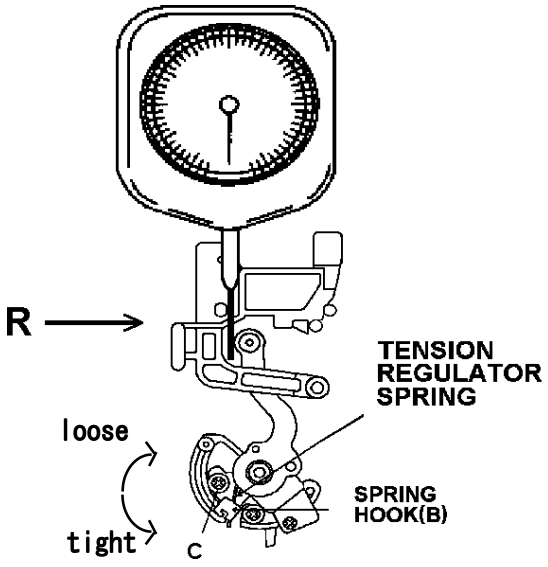


## 5-9. Tension Regulator Spring Adjustment

| | |
|---|---|
| **BOARD** | SERVO |
| **SPEC** | 11±1gf |
| **TEST POINT** | TP201(SERVO:F1) |
| **ADJUSTMENT** | Tension Regulator Spring hook (B) |
| **MODE** | STOP |
| **TOOL** | Digital Volt Meter<br>VFK1188(30g Dial Tension Gauge) |

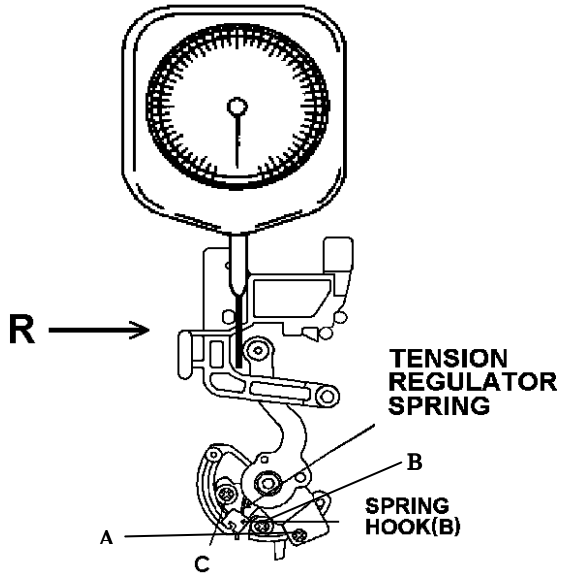
1. Connect the Digital Volt Meter to Test point.
2. Place the VTR into no tape loading mode.
3. Insert the tension gauge to push the tension post to the direction R until the voltage at the TP201 is 3.8V (PLAY position)
4. Loosen the screw (C) and adjust the position of hook (B) so that the indication of gauge is within specification.



## 5-10. REV Tension Confirmation

| | |
|---|---|
| **BOARD** | SERVO |
| **SPEC.** | 18±2gf |
| **TEST POINT** | TP201(SERVO:F1) |
| **MODE** | STOP |
| **M.EQ** | Digital Volt Meter<br>VFK1188(30g Dial Tension Gauge) |

1. Connect the Digital Volt Meter to Test point.
2. Place the VTR into no tape loading mode.
3. Insert the tension gauge to push the tension post to the direction R until the voltage at the TP201 is 1.2V (REV position)
4. Confirm that the indication of gauge is within specification. If not, make the Tension Spring Adjustment again.
5. After finish this adjustment , grew the screw A,B and C . The grew quantity at B is half of A and C.

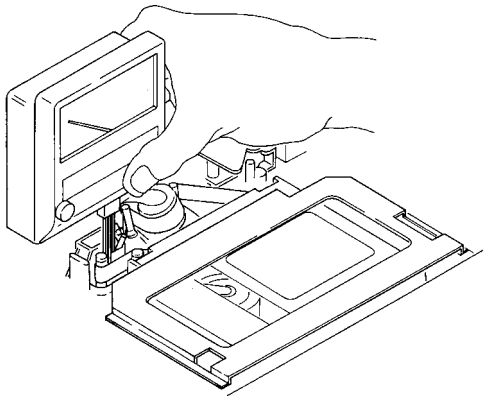


## 5-11. Tension Confirmation

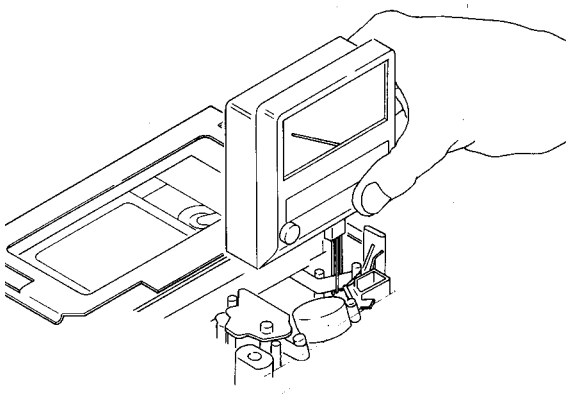
| | |
|---|---|
| **SPEC** | (PLAY)6.0±1gf<br>(REV) 9.0±2gf |
| **MODE** | PLAY、REV×1 |
| **TAPE** | 63 min M size Blank Tape |
| **TOOL** | VFK1145(Tension Meter) |

1. Play back beginning portion of the tape.
2. Insert the tension meter between S3 post and S4 post.(Refer to figure).
3. Confirm the tension is within specification.
4. Place the unit in REV mode.
5. Insert the tension meter between S4 post and S5 post.(Refer to figure)
6. Confirm the tension is within specification.

**NOTE:** Be careful not to give some tape damage.

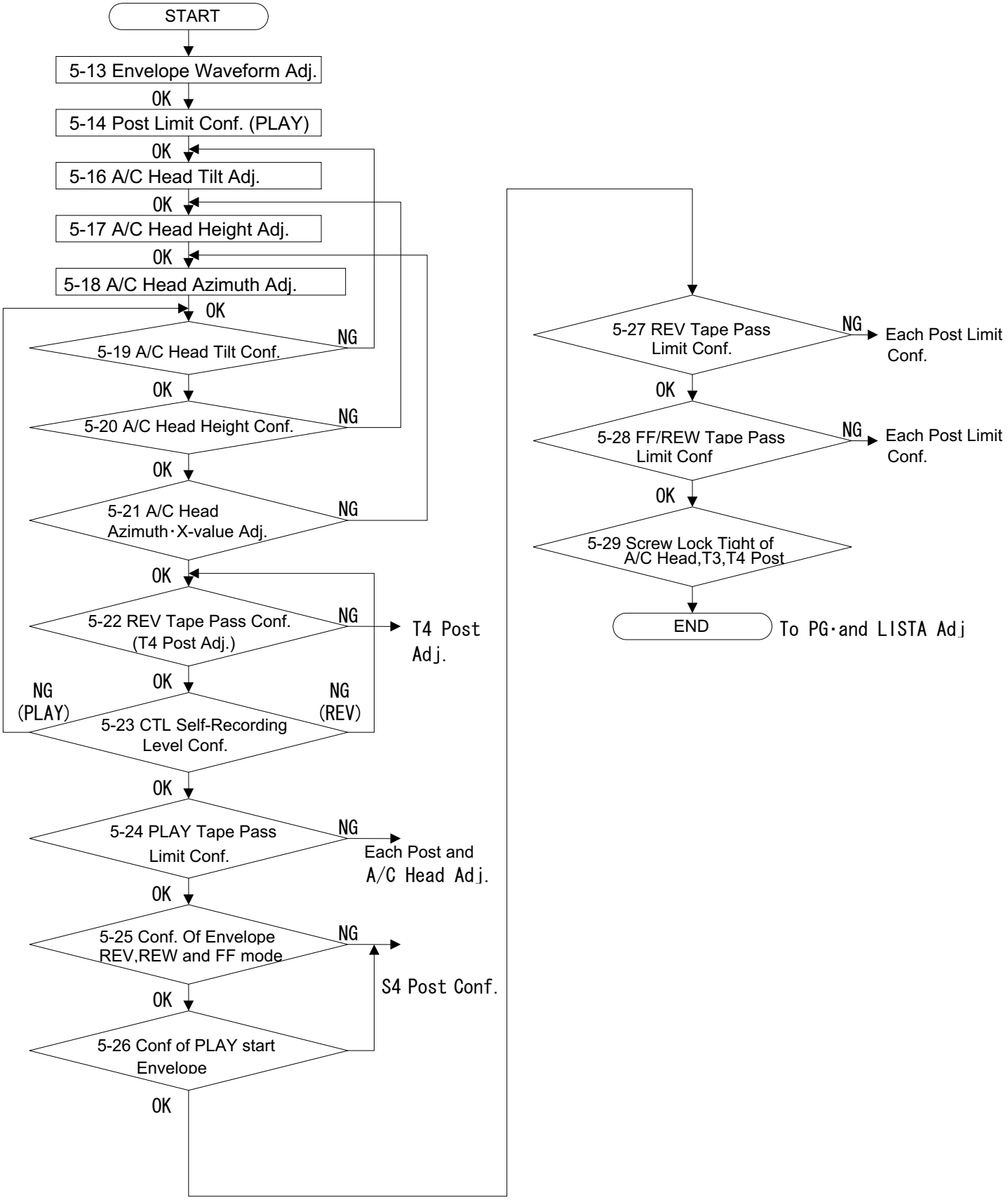


**Play Tension**



**Rev Tension**

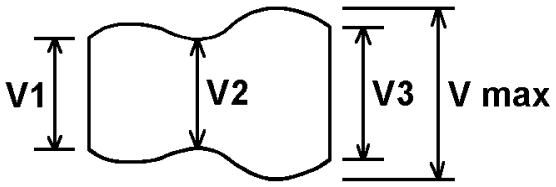
## 5-12. Tape Pass Adjustment Procedure



## 5-13. Envelope Waveform Adjustment

| | |
|---|---|
| **SPEC** | V1/Vmax、V2/Vmax、V3/Vmax ≧ 0.8 |
| **TEST POINT** | TP16:R/P ENV (RF AMP Board:H4)<br>TP1 :TRIG/HSW (RF AMP Board:H4) |
| **ADJUSTMENT** | S1、T1 Post Height |
| **MODE** | PLAY(ATF) |
| **TAPE** | **NTSC:** VFM3580KM<br>**PAL:** VFM3680KM |
| **M.EQ** | Oscilloscope |
| **TOOL** | VFK1149(Post Driver) |

1. Playback the alignment tape.
2. Adjust S1 and T1 post height so that the R/P envelope output is within the specification.
3. When the S1 and T1 posts are adjusted, first raise the post height and make small the entrance and exit side of the envelope, then down the post until envelope becomes flat.
4. With order to adjustment, basically adjust T1 post for makes flat at exit side of envelope first and adjust S1 post.
5. After finish this adjustment, unload the tape and load the tape again, then confirm the shape of Envelope waveform does not changed.



## 5-14 Post Limit Confirmation (PLAY)

| | |
|---|---|
| **SPEC** | Post limit shown in the table<br>No tape curl |
| **MODE** | PLAY |
| **TAPE** | Blank Tape |
| **TOOL** | VFK1149(Post Driver)<br>VFK1151(Nut Driver) |

1. Confirm that the tape pass limit follow the as shown as below table and adjust it in case of need.
2. Confirm that the kinds of D、E and F condition do not appeared on the tape as shown in figure.

| Post | Limit | Adjustment |
|---|---|---|
| S5 | Lower limit or Free | S5 Post Height |
| S4 | Lower Limit | S4 Post Height |
| S1 | Upper Limit | Envelope waveform |
| T1 | Upper Limit | Envelope waveform |
| T3 | Lower Limit | T3 Post Height |
| T4 | Lower limit or Free | T4 Post Height |

**A: UPPER**

**B: FREE**

**C: LOWER**

**D: Curl**

**E: Bend**

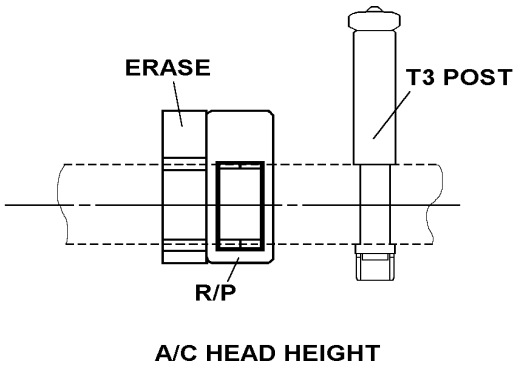
**F: Drop**

## 5-15. A/C Head Adjustment Method

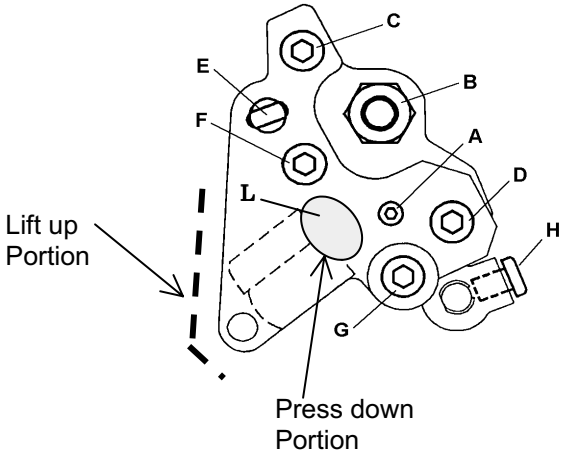
| Adjustment Item | SCREW | Adjustment Method | Torque |
|---|---|---|---|
| Tilt adjustment | A | Tighten direction ・・・ Decrease CUE<br>Loosen direction ・・・ Increase CUE | |
| Height adjustment | B | Tighten direction ・・ In case of increase CTL, when A/C Head Press down.<br>Loosen direction ・・ In case of increase CTL, when A/C Head lift up. | |
| Azimuth adjustment | F | Phase is adjusted by screw F | |
| X-value adjustment | C<br>D | Adjust X-value by VFK0357 at Hole (E), then tighten the screw (C) and (D) to fix A/C Head horizontal position. | 2.5Kg.cm |
| Fixed Tilt and Azimuth | G | Screw (G) is always tighten during adjustment except Tilt and Azimuth. | 1.0Kg.cm |
| Fixed height | H | After height adjustment, tighten the screw (H) to fix height of A/C Head. | |

| SCREW | Tool for adjustment |
|---|---|
| A | VFK1178 ( 0.89mm Hex Driver) |
| B | VFK1150 ( 5.5mm Tool for adjustment) |
| F | VFK1148 (1.5mm Hex Driver) |
| C,D,G | VFK1209 ( Torque Driver )<br>VFK1375 ( 1.5mm Post Axis Driver) |
| H | VFK1190 ( 1.5mm L type of Hex Wrench) |

1. Each adjustment of A/C Head should be perform under the screw (G) tightened.
2. Confirm the screw (A) does not loosen, before execute the A/C Head Tilt adjustment. The screw (A) should be always touch to top of A/C Head.
3. Be careful the tape damage at T3 Post, when adjust tilt of A/C Head.
4. When the height of A/C Head is adjusted by Nut (B), first the screw (H) should be loosen. And after height adjustment finished, tighten the screw (H) lightly.
5. Each adjustment of A/C Head should be finished at the condition of turn the each adjustment screw tighten direction. And hit the portion (L) lightly for remove the distortion.
6. Adjust alternately each A/C Head adjustment with Envelope Waveform adjustment.




A/C HEAD HEIGHT



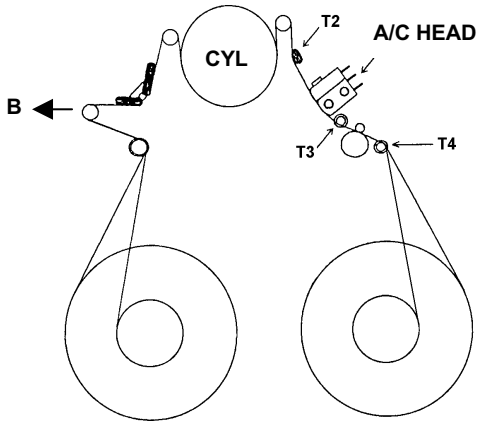
## 5-16. A/C Head Tilt Adjustment

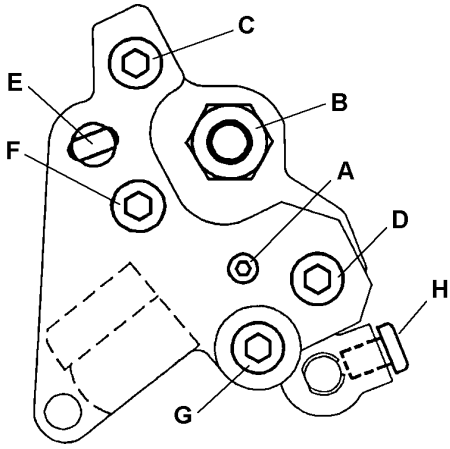
| | |
|---|---|
| **SPEC** | Lower limit at T3 Post<br>No tape curl |
| **ADJUSTMENT** | SCREW A and G (A/C Head) |
| **MODE** | PLAY |
| **TAPE** | Blank Tape |
| **M.EQ** | VFK1148、VFK1178(Hex Driver) |

1. Play back the tape and adjust screw(A) for adjustment of tilt of A/C Head so that the tape path has lower limit without curl at T3 post.
2. To adjustment, loosen the screw (G) and make curl on tape at lower flange of T3 post by screw (A). And tighten screw (A) accordingly for find the point of curl disappeared. After finish adjustment for screw (A), tighten the screw (G) is tightened with 1.0Kg/cm of torque.

**(NOTE)**

1. In case of turn clockwise screw (A).
   → Tape goes up at T3 post.
   In case of turn counter-clockwise screw (A).
   → Tape goes down at T3 post.
2. When screw adjustment finished, with each adjustment screw on A/C Head should be finished tighten direction. And confirm that the screw does not loosen.
3. Adjust and confirmation should be performed alternately with each A/C head adjustment(Azimuth and Height).



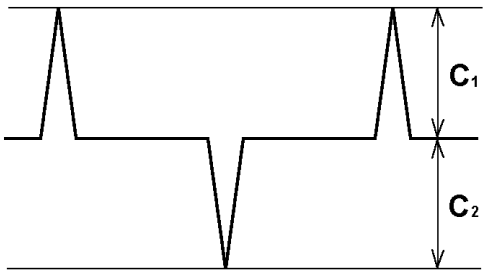
## 5-17. A/C Head Height adjustment

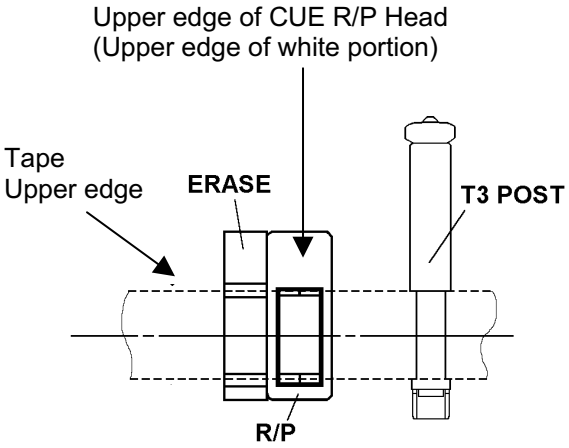
| | |
|---|---|
| **BOARD** | SERVO |
| **SPEC** | CTL Output (C1,C2≧1.8V) |
| **TEST POINT** | TP30:CTL |
| **ADJUSTMENT** | SCREW B and H (A/C Head) |
| **MODE** | PLAY |
| **TAPE** | **NTSC:** VFM3580KM (14min to 22min)<br>**PAL:** VFM3680KM (14min to 22min) |
| **M.EQ** | Oscilloscope |
| **TOOL** | VFK1150(Nut Driver)<br>VFK1190(Hex Wrench) |

1. Observe the CTL output (TP30) on the Servo board.
2. Press and Lift up to A/C Head lightly as indicated as figure position, then confirm that the CTL output level is decreased.
3. If increases CTL output, when press the A/C Head. Loosen the screw H and adjust the screw B counterclockwise until CTL output is maximized.
4. If increases CTL output, when lift up the A/C Head. Loosen the screw H and adjust the screw B clockwise until CTL output is maximized.
5. After tightening the screw H(2.0kg), confirm the level again.

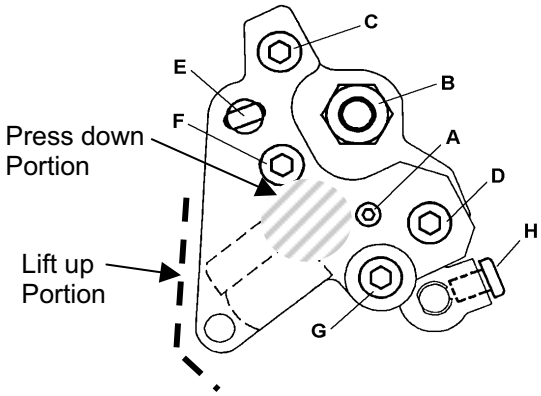
**< NOTE >**

1. Adjust alternately with other A/C head adjustments(Azimuth, Height).




**A/C HEAD HEIGHT**



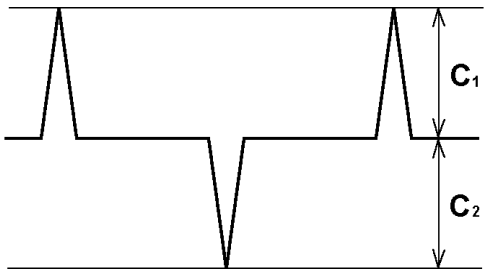
## 5-18. A/C Head Azimuth Adjustment

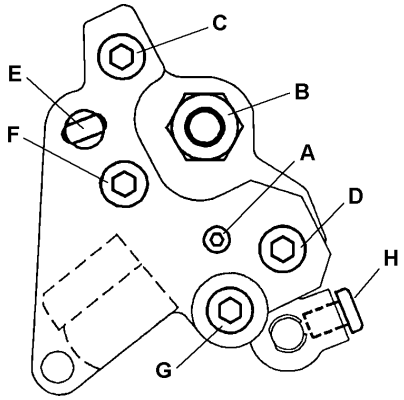
| | |
|---|---|
| **BOARD** | SERVO |
| **SPEC** | CTL Output:C1,C2 = C1 max、C2 max |
| **TEST POINT** | TP30:CTL |
| **ADJUSTMENT** | SCREW F (A/C Head) |
| **MODE** | PLAY |
| **TAPE** | **NTSC:** VFM3580KM (14min to 22min)<br>**PAL:** VFM3680KM (14min to 22mi) |
| **M.EQ** | Oscilloscope |
| **TOOL** | VFK1148(Hex Driver) |

1. Observe the CTL output (TP30) on the Servo Board.
2. To adjustment, loosen the screw (G) and adjust screw (F) so that the CTL output become maximum.
3. Tighten screw (G) with 1.0Kg torque.

**< NOTE >**

1. Adjust alternately with other A/C head adjustments(Azimuth, Height).

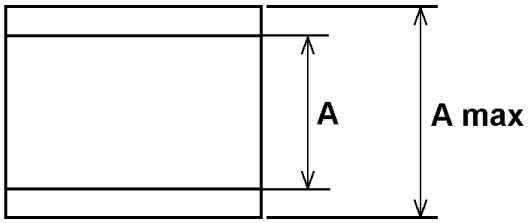


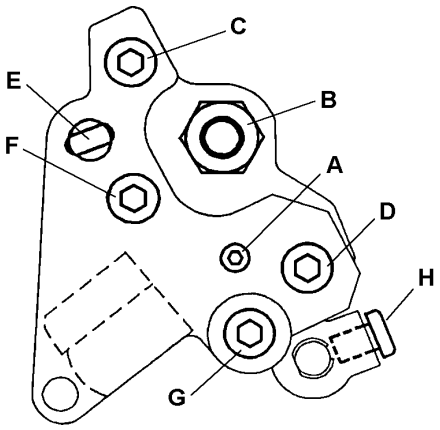



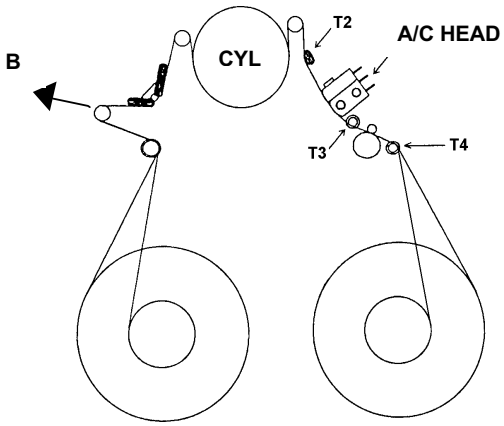
## 5-19. A/C Head Tilt Confirmation

| | |
|---|---|
| **SPEC** | A/Amax ≧ 0.8 |
| **TEST POINT** | TP381:CUE (ADDA CUE Board:H2) |
| **ADJUSTMENT** | SCREW A and G (A/C Head) |
| **MODE** | PLAY |
| **TAPE** | **NTSC:**VFM3580KM (14min to 22min)<br>**PAL:** VFM3680KM (14min to 22min) |
| **M.EQ** | Oscilloscope |
| **TOOL** | VFK1178、VFK1148(Hex Driver) |

1. Playback the Alignment tape.
2. Confirm that the screw G and H are not loosened.
3. Push the tension arm follow the arrow (B) direction as shown in figure as range of T2 post does not move. And confirm that the CUE output level is within specification.
4. If out of specification, loosen the screw G and adjust the screw A, then tighten the screw G with 1.0kg torque.
5. The final touch of the adjustment must be turned clockwise. After this adjustment, confirm that the screw A is not loosened.
6. If adjust the screw A, Confirm that the tape pass condition follow Post Limit Confirmation procedure (item 5-14).



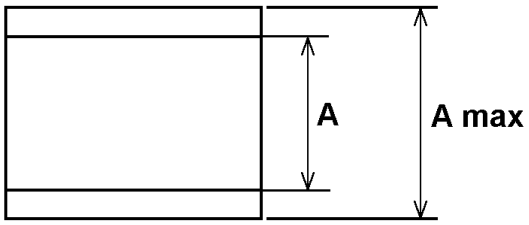



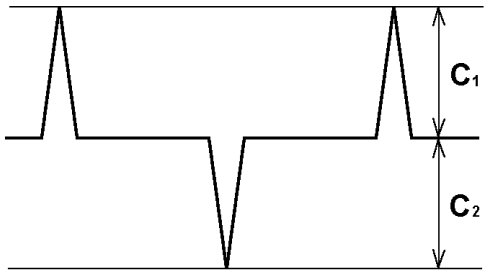



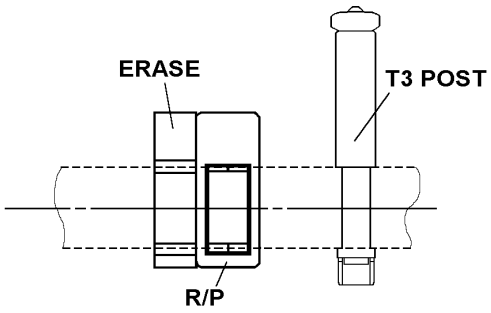
## 5-20. A/C Head Height Confirmation

| | |
|---|---|
| **SPEC** | A≧0.95×Amax、C1、C2 ≧ 1.8V |
| **TEST POINT** | TP381 CUE (ADDA CUE Board:F8)<br>TP30 CTL (SERVO Board:F1) |
| **ADJUSTMENT** | SCREW B and H(A/C Head) |
| **MODE** | PLAY |
| **TAPE** | **NTSC:** VFM3580KM (14min to 22min)<br>**PAL:** VFM3680KM (14min to 22min) |
| **M.EQ** | Oscilloscope |
| **TOOL** | VFK1150(Nut Driver)<br>VFK1190(Hex Wrench) |

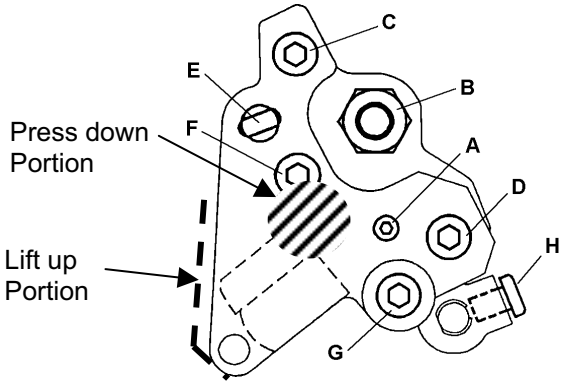
1. Playback the Alignment tape.
2. Press and Lift up to A/C Head lightly as indicated as figure position, then confirm that the CUE output level at TP381 does not increased.
3. If increases CUE output, A/C Head Height adjustment performed. And also confirm that the CTL output level.
4. If adjust the height of A/C Head, Azimuth also changed. Therefore adjust and confirm alternately Height and Azimuth of A/C Head.
5. After screw (H) is tightened, height and tilt of A/C Head are changed. Therefore confirmation of specification must be done after tightening the screw (H).



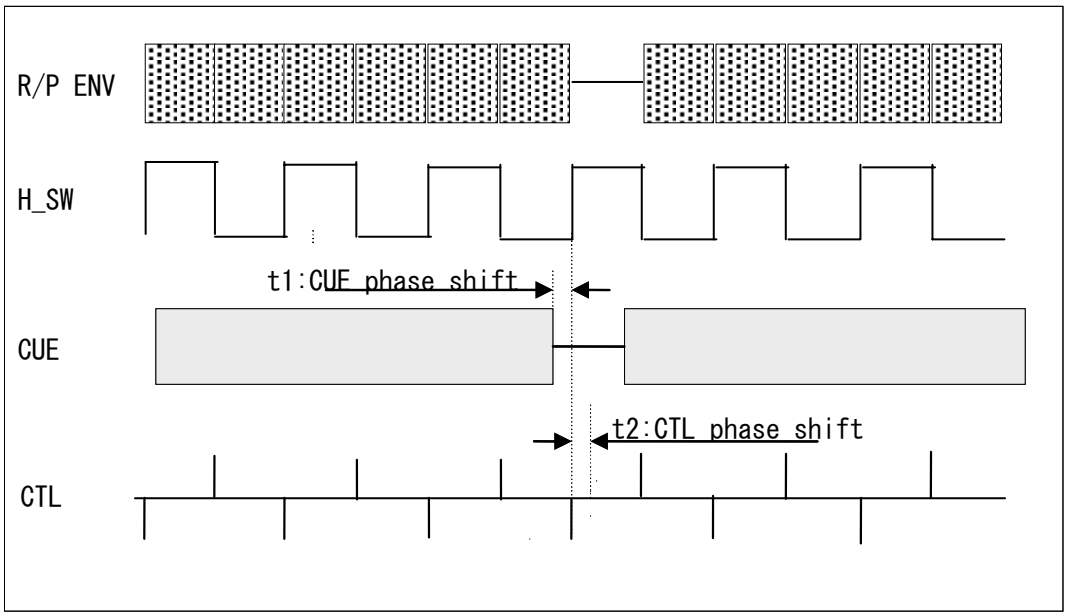

**A/C HEAD HEIGHT**

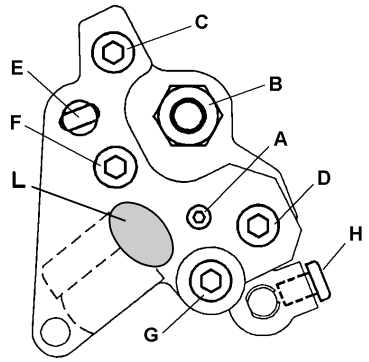


## 5-21. A/C Head Azimuth and X-value Adjustment.

| | | | |
|---|---|---|---|
| **SPEC.** | As shown in below figure.<br>250us≦t1、t2≦+250us | **TEST POINT** | TP16 :RP ENV (RF AMP Board:H4)<br>TP233:RP HSW (SERVO Board:F1)<br>TP381:CUE AUDIO (ADDA CUE Board:F8)<br>TP30 :CTL (SERVO:F1) |
| **ADJUSTMENT** | A/C Head each screws | | |
| **MODE** | PLAY<br>SERVO ADJUST: A07:RP LINEAR P | **M.EQ** | Oscilloscope |
| **TAPE** | **NTSC:** VFM3582KM ( X-value)<br>**PAL:** VFM3682KM ( X-value) | **TOOL** | VFK0357(Eccentric Screwdriver) |

1. Open the Service menu and select the item “A07:RP LINEAR P” on Servo Adjust menu for RP Head ATF Playback.
2. Playback the X-value Alignment tape.
3. Confirm that the phase of CUE and CTL are within specification against RP HSW pulse trigger. If not perform the X-value adjustment follow the below procedure.
4. Adjust A/C Head Azimuth (refer to Azimuth adjustment procedure) so that the CTL and Lack part of CUE(t2) is match in the phase.
5. Confirm the lack track of envelope, and select the HSW correspond with it ( The lack track is correspond HSW high with L ch).
6. Adjust X-value so that the reference of HSW and CTL trigger (CTL falling edge is the reference: refer to below figure) are match in the phase(t1). To adjust X-value, loosen the screw C and D, adjust the hole E by VFK0357. After adjustment tighten the screw C and D with 2.5Kg torque. At this time adjust the phase simultaneously with Azimuth so that the CTL and CUE phase is kept.
7. Hit the top plate ( portion L as shown in below figure ) of A/C Head lightly by a pointed end of Eccentric driver , then confirm the phase is not shifted finally.



## 5-22. REV Tape Pass Confirmation and Adjustment (T4 post height adjustment)

| | | | |
|---|---|---|---|
| **SPEC.** | C1、C2≧Cp1、Cp2×0.75<br>Lower limit at T3 post on REV mode | **TAPE** | **NTSC:** VFM3580KM<br>**PAL:** VFM3680KM |
| **TEST POINT** | TP30(SERVO:F1) | **M.EQ** | Oscilloscope |
| **ADJUSTMENT** | T4 post height | **TOOL** | VFK1151(Nut Driver) |
| **MODE** | REV×1 | | |

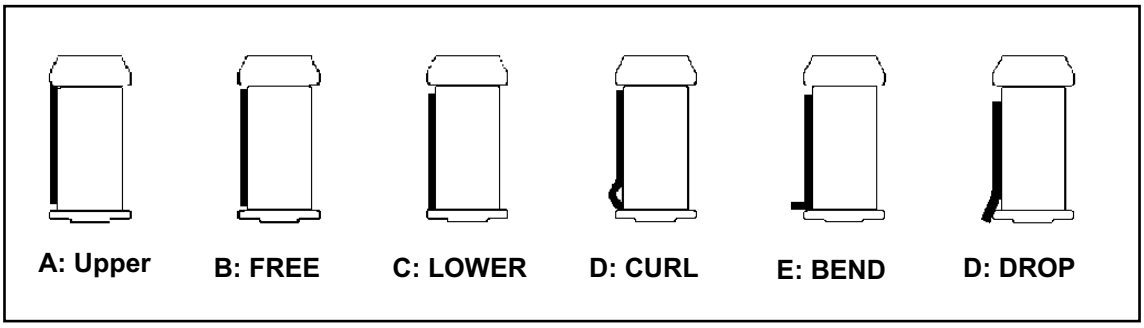
1. Place unit into REV mode, and confirm the post limit and CTL signal are in the specification. IF not, adjust T4 post follow the below procedure.
2. Turn the Nut of T4 post clockwise or counter-clockwise follow the tape limit condition at T3 post. The maximum rotation angle is 90 degree.
3. Place unit into REV X1 mode and confirm the CTL output level is become more than 75% on play mode. Confirm the tape pass limit become lower limit at T3 post and the tape does not have curl at T3 and T4 post.
4. However out of specification, adjust T4 post height follow the Post Height Pre-adjustment procedure.

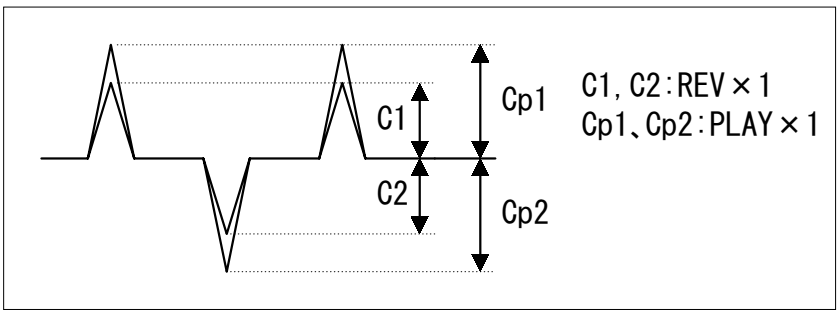
T4 Nut adjustment direction

| Direction of adjustment nut of T4 post | CTL level on REV mode | Lower limit at T3 post On REV mode |
|---|---|---|
| Tighten direction | Increase | Tape touch to strong |
| Loosen direction | Decrease | Tape touch to weak |

Post Limit

| Post Name | Tape limit | | | | | |
|---|---|---|---|---|---|---|
| | A | B | C | D | E | F |
| T3 Post | × | × | ○ | × | × | × |
| T4 Post | ○ | ○ | ○ | × | × | × |



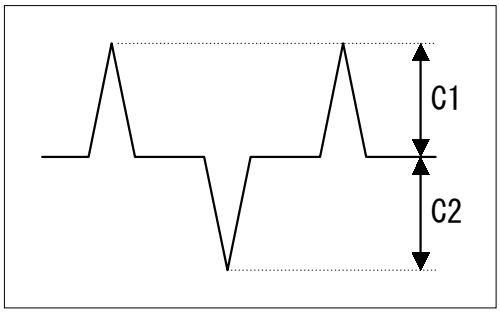



## 5-23. CTL Self Recording Level Confirmation

| | |
|---|---|
| **SPEC.** | Refer to below table |
| **TEST POINT** | TP30 (SERVO Board) |
| **MODE** | REC and PLAY |
| **TAPE** | Blank tape |
| **M.EQ** | Oscilloscope |

**NOTE:** This confirmation should be done after each screws of A/C Head are fixed.

1. Record the blank tape.
2. Playback the recorded portion and confirm the CTL level is within specification as shown as below table on PLAY and REV X1 mode.




| CTL Output Level C1,C2 | | |
|---|---|---|
| PLAY | REV × 1 | REV × 0.2 |
| C1,C2≧1.8V | C1,C2≧1.4V | C1,C2≧1.2V |

CTL Output Level C1,C2

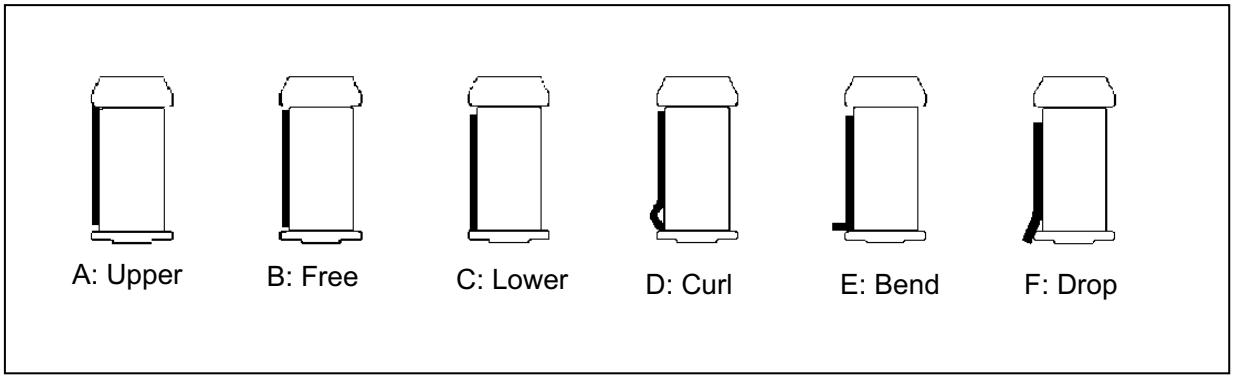
1. PLAY NG → Re-confirm the A/C Head height adjustment.
2. REV NG → Re-confirm the T4 post adjustment.

## 5-24. PLAY Tape Pass Limit Confirmation

| | |
|---|---|
| SPEC. | Each Post limit shown in table |
| MODE | PLAY |
| TAPE | M cassette (MP tape) tape.　Tape beginning and end portion |

| Post Name | Tape Limit（Refer the figure） | | | | | | Adjustment | |
|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | | |
| S5 post | X | O | O | X | X | X | S4、S5 Post | Post Height Pre-Adj. |
| S4 post | X | X | O | X | X | X | | |
| S1 post | O | X | X | X | X | X | S1 Post | Envelope waveform Adj. |
| T1 post | O | X | X | X | X | X | T1 Post | Envelope waveform Adj. |
| T3 post | X | X | O | X | X | X | A/C Head tilt | A/C Head tilt Adj. |
| T4 post | X | O | O | X | X | X | T4 Post | Post Height Pre-Adj |

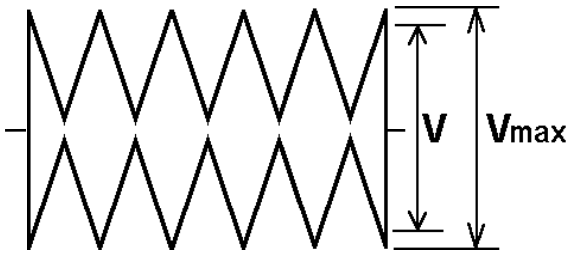
1. Place unit into PLAY mode and confirm the each post limits is within specification.
2. If out of specification, adjust the post height follow the each adjustment procedure (Refer to above table).



## 5-25. Confirmation of Envelope on REV,REW and FF mode.

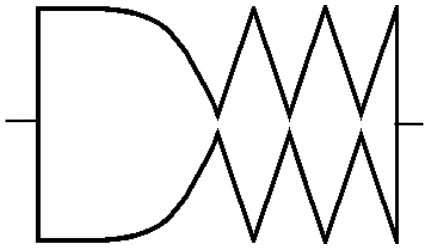
| | |
|---|---|
| **SPEC.** | V/Vmax ≧ 0.9 |
| **TEST POINT** | TP16 :RP ENV (RF AMP Board:H4) |
| **MODE** | REV、REW、FF |
| **TAPE** | **NTSC:** VFM3580KM<br>**PAL:** VFM3680KM |
| **M.EQ** | Oscilloscope |

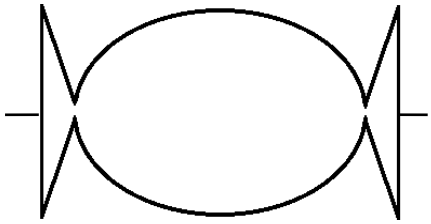
1. Confirm that the Envelope waveform becomes in the specification on REV,REW and FF mode as refer to figure and below.
   - Waveform must be Diamond Style.
   - All the peak level must be more than 90% of maximum level.
     V/Vmax ≧ 0.9
2. If out of spec, adjust S4 post height.




**O K**

**N G**





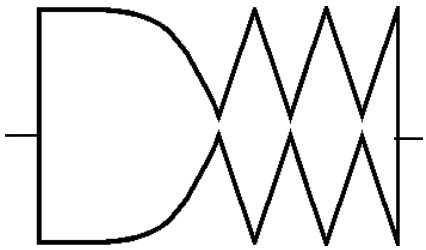
## 5-26. Confirmation of Play Start Envelope

| | |
|---|---|
| **TEST POINT** | TP16:RP ENV (RF AMP Board:H1) |
| **MODE** | REW/REV → PLAY<br>Loading completion → PLAY<br>FF → PLAY |
| **TAPE** | L cassette(123min、Recorded tape)<br>Tape beginning portion |
| **M.EQ** | Oscilloscope |

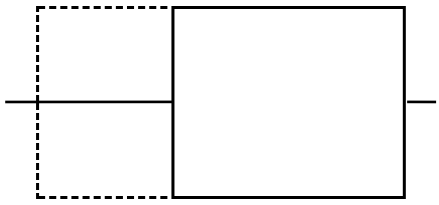
**Note:** This adjustment must be done after Envelope Waveform Adjustment.

1. Confirm that the envelope appears immediately, when the mode is changed from REW to PLAY、REV to PLAY、FF to PLAY、and Lording to PLAY mode.
2. If out of spec, adjust S4 post height.

O K



N G

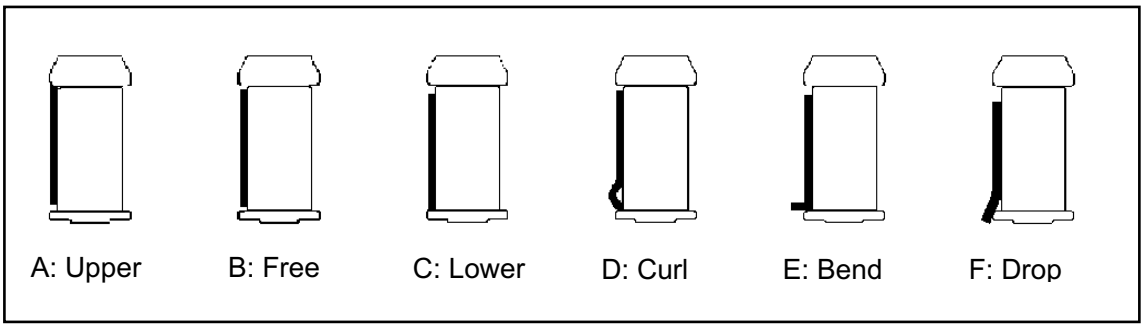


## 5-27. Tape Pass Limit Confirmation

| | |
|---|---|
| SPEC | Each Post limit shown in table. |
| MODE | REV |
| TAPE | M cassette (MP tape) tape. Tape beginning and end portion |

| Post Name | Tape Limit(Refer to figure) | | | | | |
|---|---|---|---|---|---|---|
| | A | B | C | D | E | F |
| S5 Post | O | O | O | X | X | X |
| S4(Tension) Post | X | O | O | X | X | X |
| S1 Post | O | X | X | X | X | X |
| T1 Post | O | O | O | X | X | X |
| T3 Post | X | X | O | X | X | X |
| T4 Post | X | X | O | X | X | X |

1. Place unit into REV mode and confirm the each post limits is within specification.
2. If out of specification, adjust the post height follow the each adjustment procedure (Refer to above table).



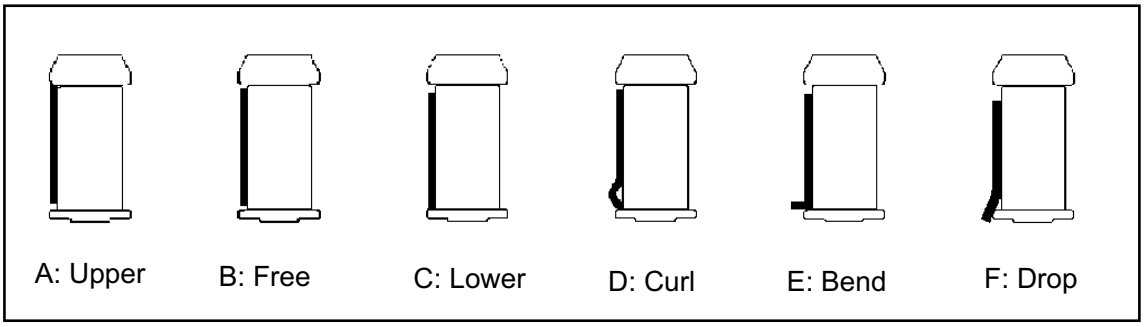
## 5-28. FF、REW Tape Pass Limit Confirmation

| | |
|---|---|
| SPEC. | Each Post limit shown in table. |
| MODE | FF,REW |
| TAPE | M cassette (MP tape) tape. Tape beginning and end portion |

| Post Name | Tape Limit(Refer to figurte) | | | | | |
|---|---|---|---|---|---|---|
| | A | B | C | D | E | F |
| S5 Post | O | O | O | X | X | X |
| S4(Tension) Post | X | O | O | X | X | X |
| S1 Post | O | X | X | X | X | X |
| T1 Post | O | O | O | X | X | X |
| T3 Post | O | O | O | X | X | X |
| T4 Post | O | O | O | X | X | X |

1 Place unit into FF and REV mode and confirm the each post limits is within specification.

2. If out of specification, adjust the post height follow the each adjustment procedure (Refer to above table).

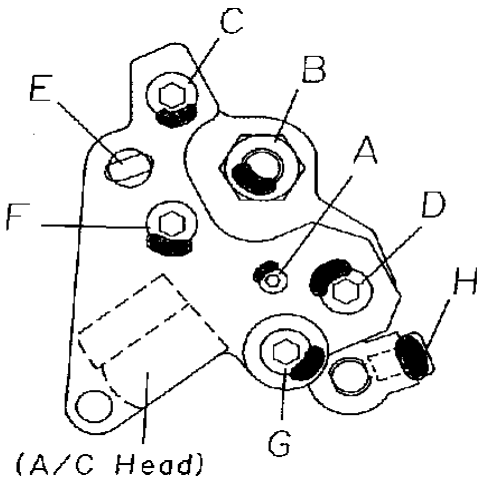


## 5-29. Screw Lock Tight of A/C Head and T3、T4 Post

**[Screw Lock Tight of A/C Head]**

| | SCREW A | OTHER SCREW |
|---|---|---|
| Lock Tight Grew Quantity | 1/3 of the screw | 1/3 of the screw |

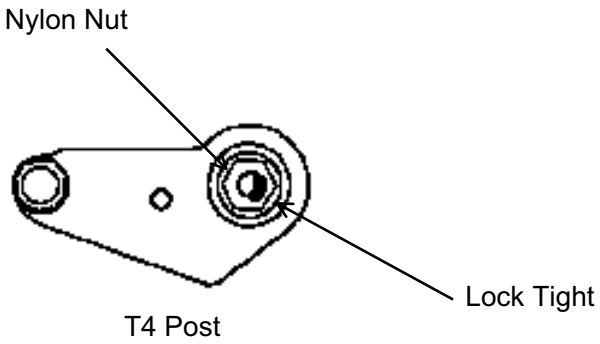
1. Fix the screw by the Lock Tight Grew after adjustment..
2. Before adjustment melt the Grew.




**[Screw Lock Tight of T3 and T4 Post]**

| | T3 Post | T4 Post |
|---|---|---|
| Lock tight grew quantity | 1/4 of the screw | 1/4 of the screw |

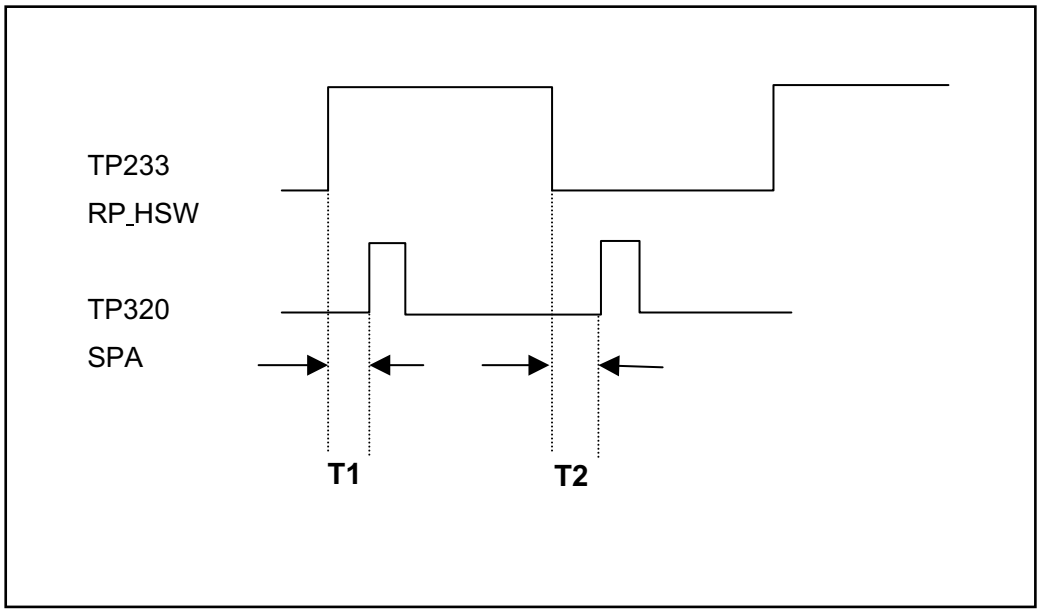
1. After adjustment, attach the lock tight grew at the Nylon nut..
2. Before adjustment, melt the Grew.



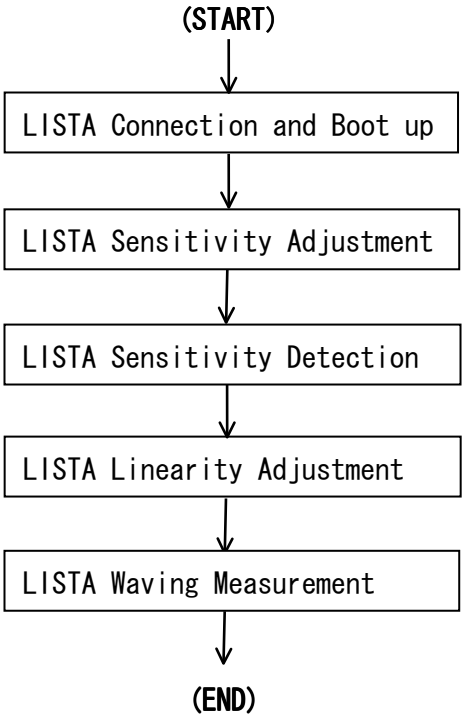
## 5-30. PG SHIFTER Adjustment

| | |
|---|---|
| SPEC. | T1, T2 = 126.4 $\mu$sec ± 2 $\mu$sec. |
| MODE | PLAY |
| TEST POINT | TP320 SPA (SERVO Board:F1)<br>TP233 R/P HSW (SERVO Board:F1) |
| ADJUSTMENT | A01:PG SHIFTER (EVR on SERVO ADJUST menu) |
| M.EQ | Oscilloscope |
| TAPE | **NTSC:** VFM3580KM<br>**PAL:** VFM3680KM |

1. Open the SERVO ADJUST menu on the Service menu and select the item " A01:T PG SHIFTER ".
2. Playback the Alignment tape.
3. Press the (◀) or (▶) button and keep it until the numerical value of "A01:PG SHIFTER" are renewed.
4. Connect the scope toTP233 and TP320. Trigger the scope by TP233. Then it is displayed as shown in figure.
5. Confirm that the period of T1 and T2 in specification (126.4 $\mu$sec±2 $\mu$sec).



## 5-31. LISTA Adjustment Procedure.



## 5-32. LISTA Connection and Boot Up

| | |
|---|---|
| TEST POINT | TP321 ATF ERR (SERVO Board:F1)<br>TP233 PB HSW (SERVO Board:F1)<br>TP232 R/P HSW (SERVO:Board:F1)<br>TG510 GND (SERVO Board:F1) |
| M.EQ | P/C (AD Board should be installed),Oscilloscope |
| TAPE | **NTSC:** VFM3581KM (LISTA)<br>**PAL:** VFM3681KM (LISTA) |
| TOOL | VFK1481(LISTA Software),VFK1186(LISTA Cable) |

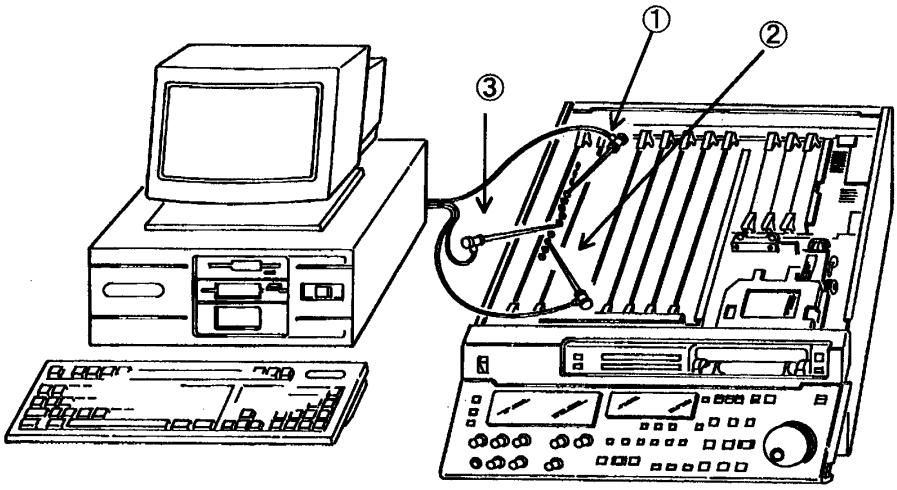
1. Connect the LISTA Cable to A/D board on PC.
2. Connect the Clips of LISTA Cable to test point on Servo Board as follow as below.

①.ATF：TP321 (ATF error)

②.HSW：TP233 (HSW:RP) or TP232 (HSW:PB)

③.GND：TG510 (GND)

**CONNECTION**



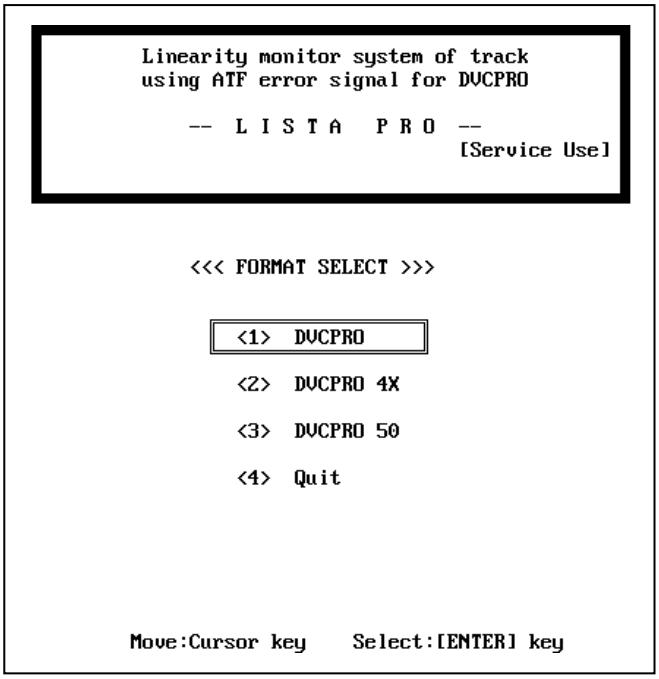

3. Boot up the LISTA software on DOS mode.

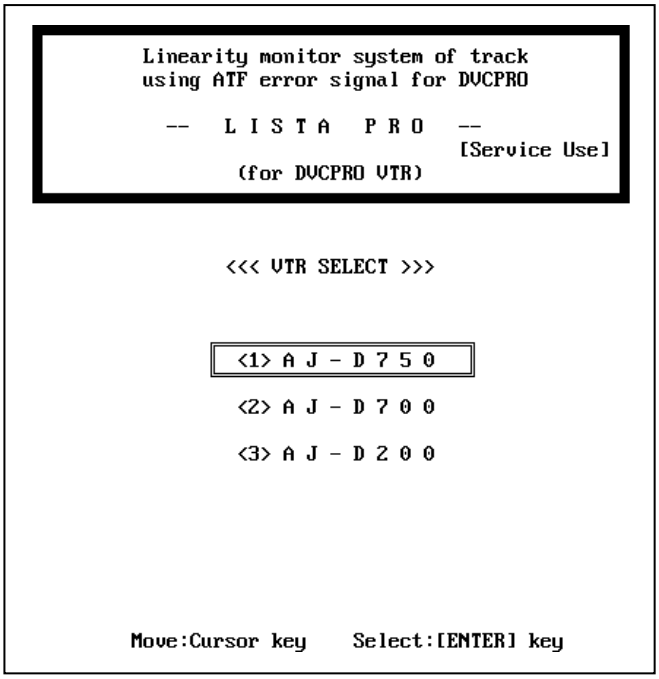
★ Install and Boot up.

All files on the floppy disk (VFK1481) copy to created directly on PC(**i.e.** C:¥LISTA).

Type “LISTA” and press ENTER Key, then boot up the LISTA software VFK1481

4. After boot up LISTA software, select the item “ DVCPRO ” for format select on the menu.
5. Select the item “ AJ-D750 ” for selected model on the menu (AJ-D440/450 is equivalent to AJ-D750).

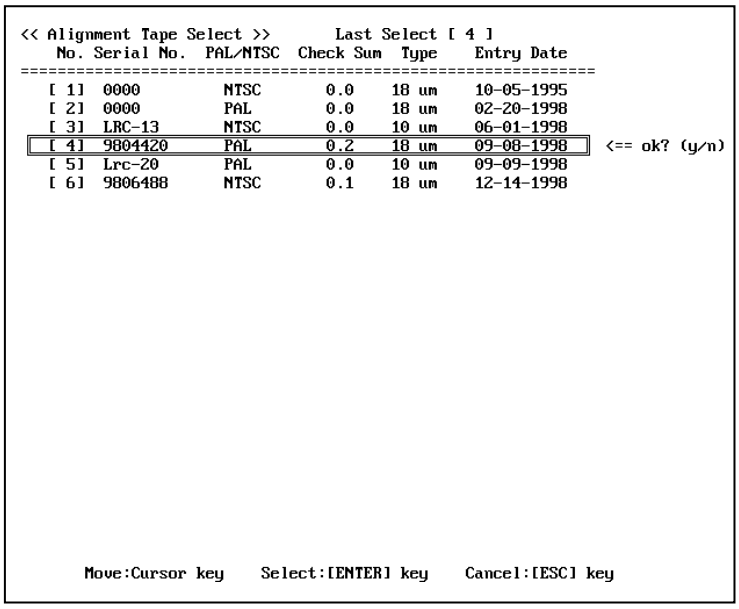




Linearity monitor system of track
using ATF error signal for DVCPRO
-- L I S T A P R O --
[Service Use]
(for DVCPRO VTR)
<<< VTR SELECT >>>
<1> A J - D 7 5 0
<2> A J - D 7 0 0
<3> A J - D 2 0 0
Move:Cursor key Select:[ENTER] key

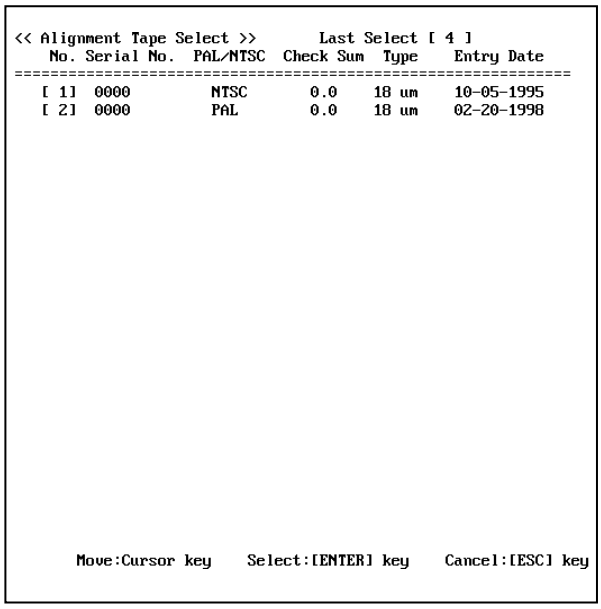
**6.** Next select the Serial number of the alignment tape on the screen. In case of LISTA software have not resisted data of alignment tape, press the ESC key, then main menu is display on the screen. And select item “ <4> Alignment Tape ” for entry the data on the attachment sheet, which is enclosed of alignment tape.

7. In case of LISTA software have resisted data of alignment tape, select the serial number of Alignment tape, then appear message “ok?(y/n)” on the screen. And press “ Y ” or “ ENTER ” key, then LISTA main menu is display on screen.

≪In case of Alignment tape resisted≫


<< Alignment Tape Select >> Last Select [ 4 ]
No. Serial No. PAL/NTSC Check Sum Type Entry Date
[ 1] 0000 NTSC 0.0 18 um 10-05-1995
[ 2] 0000 PAL 0.0 18 um 02-20-1998
[ 3] LRC-13 NTSC 0.0 10 um 06-01-1998
[ 4] 9804420 PAL 0.2 18 um 09-08-1998 <== ok? (y/n)
[ 5] Lrc-20 PAL 0.0 10 um 09-09-1998
[ 6] 9806488 NTSC 0.1 18 um 12-14-1998
Move:Cursor key Select:[ENTER] key Cancel:[ESC] key

≪In case of Alignment tape does not resisted≫


<< Alignment Tape Select >> Last Select [ 4 ]
No. Serial No. PAL/NTSC Check Sum Type Entry Date
[ 1] 0000 NTSC 0.0 18 um 10-05-1995
[ 2] 0000 PAL 0.0 18 um 02-20-1998
Move:Cursor key Select:[ENTER] key Cancel:[ESC] key

## ＜ How to Entry the Attachment Data of Alignment Tape ＞

1. Select the item “ <4> Alignment Tape “ on the main menu of the LISTA software.
2. Select the item “ <2> ENTRY ” on the alignment tape menu.
3. After display the screen of “ << Alignment tape Data Entry >> “, first input the Serial number follow the printed number on the tape label. And input the number “0” or “1” for select the PAL/NTSC. And after that for entry the tape type, in case of DVCPRO input to “0” , in case of DV input to “1”.
4. After select the Tape type, the frame for input the DATA and CHECK SUM appeared on the screen. Input the numerical value in numerical order on the data sheet, which are enclosed with alignment tape. If input the wrong number, appear the error message on the screen, then confirm that the data on the sheet.
5. After entry the data, select “ <1> SELECT “ on the Alignment Tape menu and select the serial number of the alignment tape.

＜＜Alignment Tape Data Entry＞＞　　Serial No.0596003(NTSC)　18um

| | |
|---|---|
| [1] | - 0.1 |
| [2] | 0.1 |
| [3] | 0.0 |
| [4] | 0.2 |
| [5] | 0.6 |
| [6] | 0.5 |
| [7] | 0.7 |
| [8] | 0.9 |
| [9] | 1.0 |
| [10] | 0.8 |

| | |
|---|---|
| [11] | 0.7 |
| [12] | 1.0 |
| [13] | 0.7 |
| [14] | 0.5 |
| [15] | 0.2 |
| [16] | - 0.5 |
| [17] | - 0.3 |
| [18] | - 0.3 |
| [19] | - 0.1 |
| [20] | - 0.6 |

| | |
|---|---|
| [21] | - 0.4 |
| [22] | - 0.2 |
| [23] | - 0.7 |
| [24] | - 0.6 |
| [25] | - 0.7 |
| [26] | - 0.3 |
| [27] | - 0.4 |
| [28] | - 0.4 |
| [29] | - 0.6 |
| [30] | - 0.3 |

| | |
|---|---|
| [31] | - 0.4 |
| [32] | - 0.6 |
| [33] | - 0.3 |
| [34] | - 0.2 |
| [35] | - 0.1 |
| [36] | - 0.3 |
| [37] | - 0.1 |

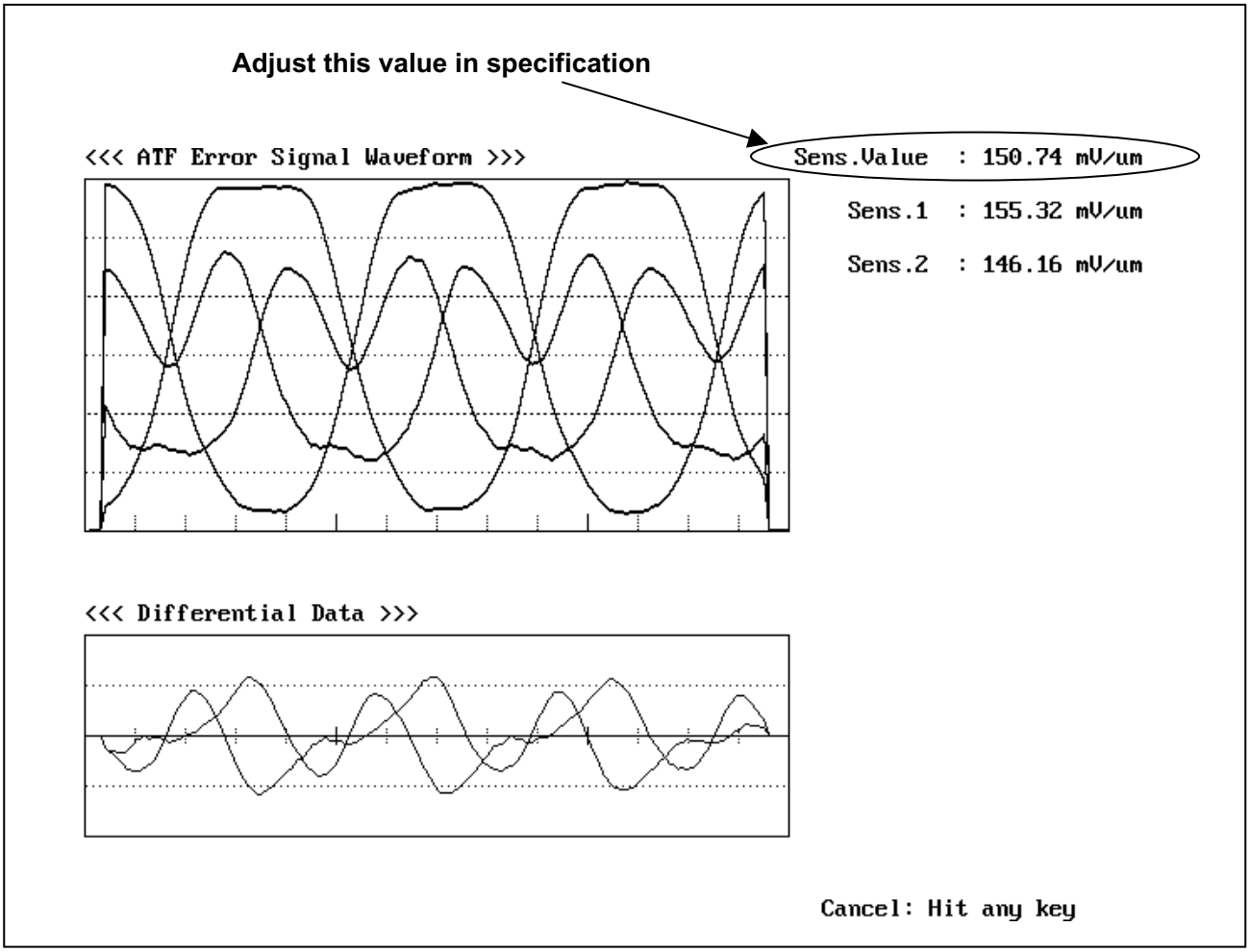
| | |
|---|---|
| [CS] | - 0.6 |

## 5-33. LISTA Sensitivity Adjustment (R/P Head)

| | |
|---|---|
| SPEC. | Sensitivity:150±15 (mV/um) |
| MODE | PLAY |
| TEST POINT | TP321 ATF ERR (SERVO Board:F1)<br>TP233 R/P HSW (SERVO Board:F1)<br>TG510 GND(SERVO Board:F1) |
| ADJUSTMENT | A06:RP GAIN P (SERVO ADJUST) |
| TAPE | **NTSC:** VFM3581KM (LISTA)<br>**PAL:** VFM3681KM (LISTA) |

**Note:** Before perform the Sensitivity adjustment, perform the PRE-EQ adjustment for adjust ENV Level (L/R) on RF AMP (H4) Board.(Refer to Sec. 4 :electrical adjustment).

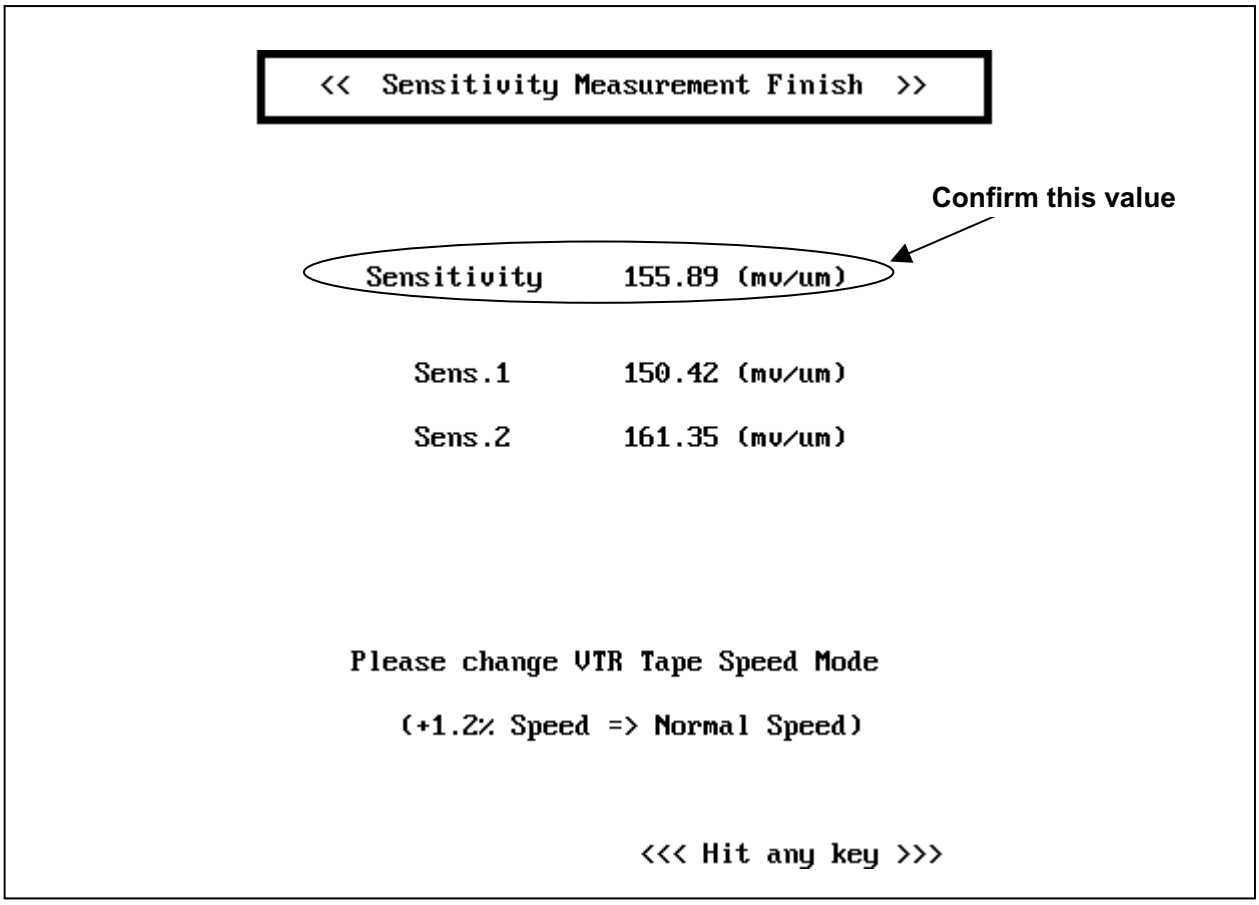
1. Connect the Test Point to clip of LISTA cable for ATF Error signal measurement.
2. Open the SERVO ADJUST menu on Service menu and select the EVR " A06:RP GAIN P ".
3. Playback the LISTA alignment tape.
4. Select the "**<6> ATF Error Signal Monitor"** on the LISTA main menu and after appear the message " 1.2% Speed… " , press ENTER key, then sensitivity value as real time and waveform appear on the screen as shown as figure below.
5. Adjust EVR " RP GAIN P " so that the sensitivity value is within specification.
6. After finish this adjustment, press ESC key to exit to the main menu.



## 5-34. LISTA Sensitivity Detection (RP Head)

| | |
|---|---|
| SPEC | Sensitivity:150±15 (mV/um) |
| MODE | PLAY |
| TEST POINT | TP321 ATF ERR (SERVO P.C.Board:F1)<br>TP233 R/P HSW (SERVO P.C.Board:F1)<br>TG510 GND(SERVO P.C.Board:F1) |
| ADJUSTMENT | ------ |
| TAPE | **NTSC:** VFM3581KM (LISTA)<br>**PAL:** VFM3681KM (LISTA) |

1. Open the SERVO ADJUST menu on Service menu and select the EVR " A06:RP GAIN P ".
2. Playback the LISTA alignment tape.
3. Select the " **<1>Sensitivity Measurement"** on the LISTA main menu and after appear the message " 1.2% that Speed… " , press ENTER key, then LISTA software start measurement of sensitivity value.
4. Confirm the sensitivity value is within specification, when the message << Sensitivity Measurement Finish>> and「Sensitivity = numerical value」 are displayed on the screen.
5. If out of specification, repeat the steps 3 and 4.
6. If still out of specification, perform the "LISTA Sensitivity Adjustment again.

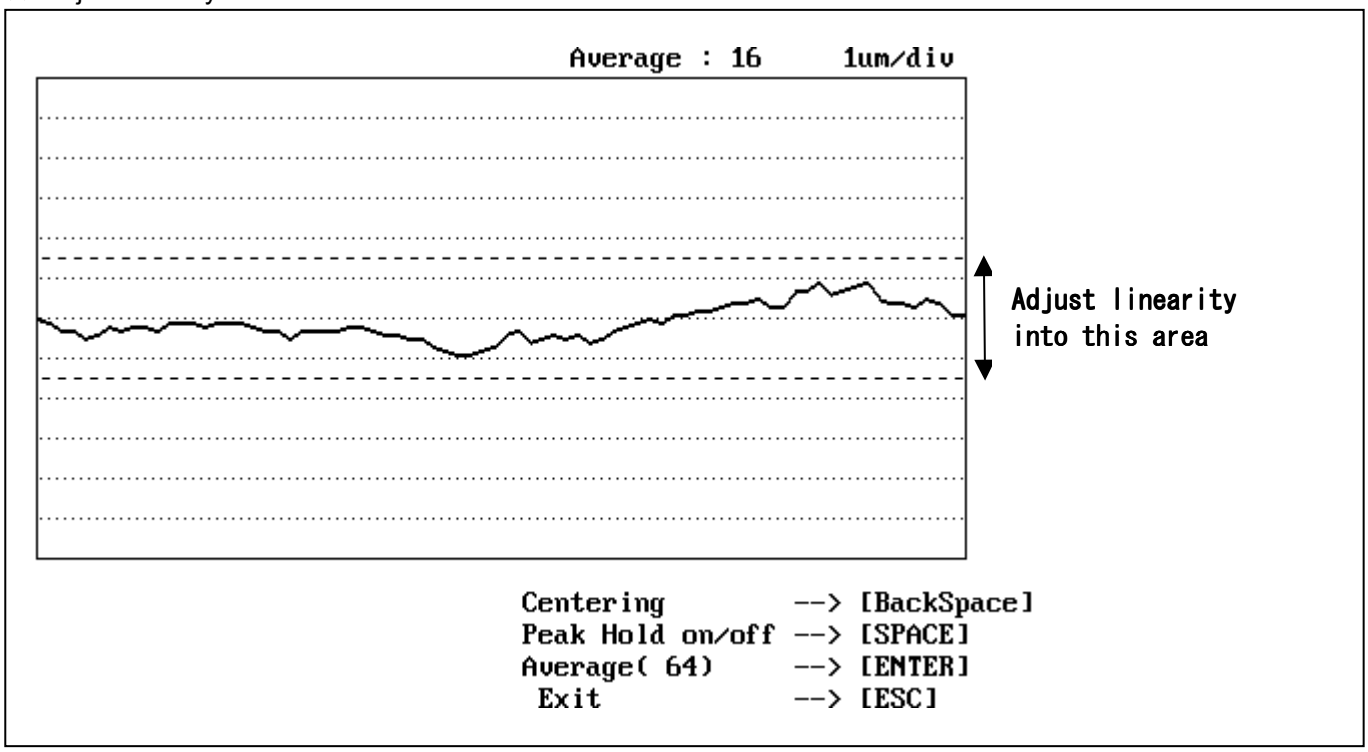


## 5-35. LISTA Linearity Adjustment and Waving Measurement.

| | |
|---|---|
| SPEC | Linearity: Less than 3um, Waving: Less than 1.5um |
| MODE | PLAY ( EVR is select to " A07: RP LINEAR P " ) |
| TEST POINT | TP321 ATF ERR (SERVO Board:F1)<br>TP233 R/P HSW(SERVO Board:F1)<br>TG510 GND (SERVO Board:F1) |
| ADJUSTMENT | S1 and T1 Post Height |
| TAPE | **NTSC:** VFM3581KM (LISTA)<br>**PAL:** VFM3681KM (LISTA) |

1. Open the SERVO ADJUST menu on Service menu and select the EVR " A07: RP LINEAR P "
2. Playback the LISTA alignment tape.
3. Select the item " (2) Linearity Measurement " on the LISTA main menu and display the linearity waveform.
4. When the waveform as shown as below figure is displayed on the screen, press the " BS (back space) " key for display the waveform to center of scale on the screen. And adjust height of S1 and T1 post by Post Driver so that the linearity waveform is become flat as possible, and it should be in the specification.

★ Adjust linearity waveform in the red dot line on the screen.




**☆ POINT:**

The part of left side of waveform(entrance side) is adjusted by height of S1 post and part of right side of waveform(exit side) is adjusted by height of T1 post.

Lower part of above waveform of figure is displayed lead on Cylinder.

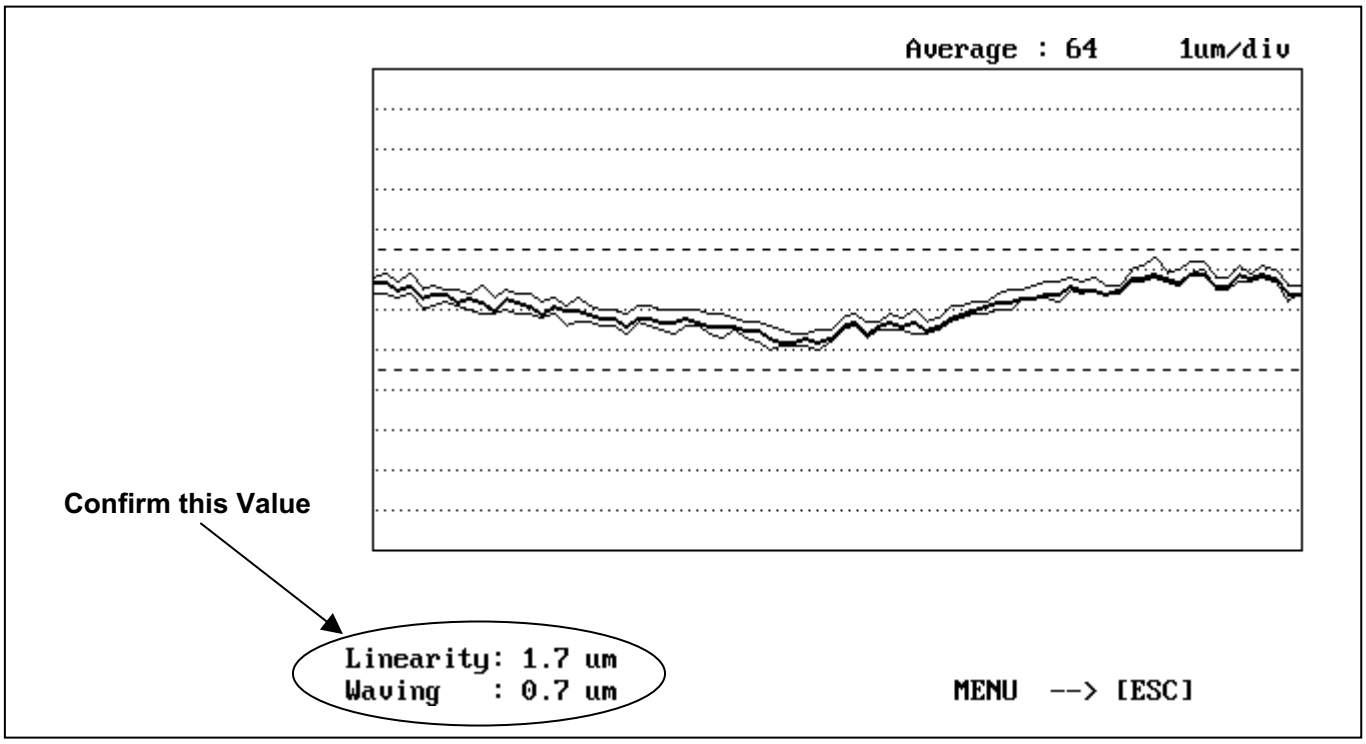
When the post driver is remove from upper part of post, linearity waveform is changed.

After finish this adjustment, eject the tape and insert the tape again for confirm the shape of linearity waveform does not changed.

5. After finish the linearity adjustment, measure the numerical value of linearity and waving.

**＊[Waving Measurement]**

1. Press “SPACE“ key for make the Peak Hold during 30 seconds, when linearity is displayed.
2. After finish the Peak Hold, press “SHIFT” and “}”,key simultaneously on the Key Board, then display the numerical values of「Linearity」and「Waving」on left lower portion of screen. And confirm the numerical values are in the specification. Also confirm the range of waving waveform is same quantity from entrance side to exit side. If the「Linearity」and「Waving」are out of specification and it caused by not enough limit of entrance or exit side of envelope, then adjust height of S1 and T1 post.
3. After this measurement is finished, press ESC key for return to main menu.




**＊NOTE: Saving of LISTA Data**

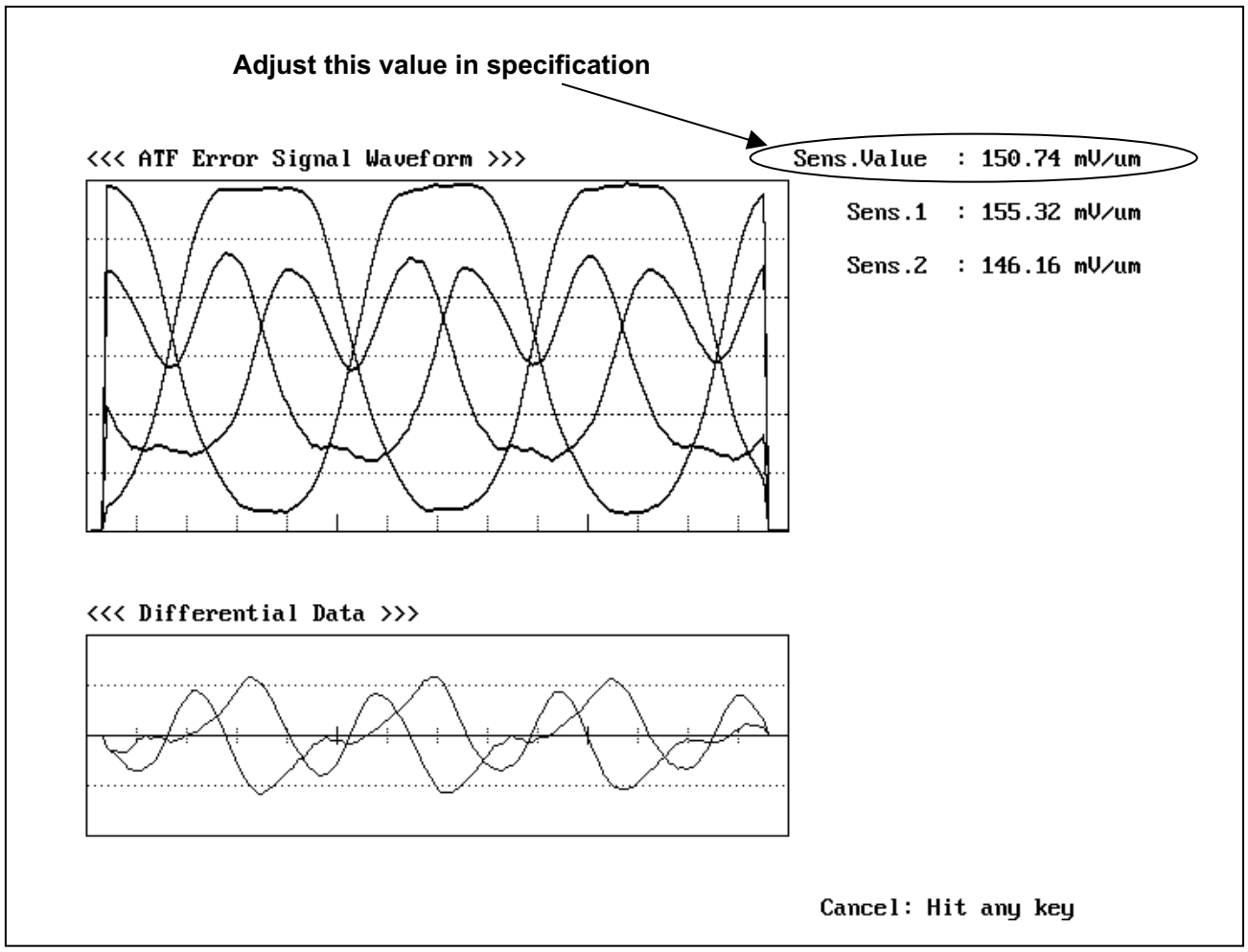
The LISTA software can be saved linearity waveform and measurement value of linearity and waving as one file data to PC.

1. Basically this operation should be performed after linearity and waving measurement finished.
2. Select the item「(3) Data Save/Load 」on the LISTA main menu. And after open the menu select the item「<1> Save」.
3. The linearity waveform as Peak Hold displayed on the screen. And after appeared message “File Name? “ on the screen, entry the File Name and Comment. File Name must be in 8 characters, and comment is must be in 20 characters. As comment, entry the Serial Number, VTR Model Number and Head Rotation Hours etc, for use management of linearity data of each VTR.
4. After completion of saving, select the item「<2> Load」on the「(3) Data Save/Load」menu, then appear the saved File Name on the screen. And select it previous saved file for confirm the waveform and numerical value displayed correctly. By press “SHIFT” and “}”,key simultaneously on the Key Board., then display the numerical values of「Linearity」and「Waving」on left lower portion of screen.

## 5-36. LISTA Sensitivity Adjustment (PB HEAD)

| | |
|---|---|
| SPEC. | Sensitivity:150±15 (mV/um) |
| MODE | PLAY |
| TEST POINT | TP321 ATF ERR (SERVO Board:F1)<br>TP232 PB HSW(SERVO Board:F1)<br>TG510 GND (SERVO Board:F1) |
| ADJUSTMENT | A04:PB GAIN P |
| TAPE | **NTSC:** VFM3581KM (LISTA)<br>**PAL:** VFM3681KM (LISTA) |

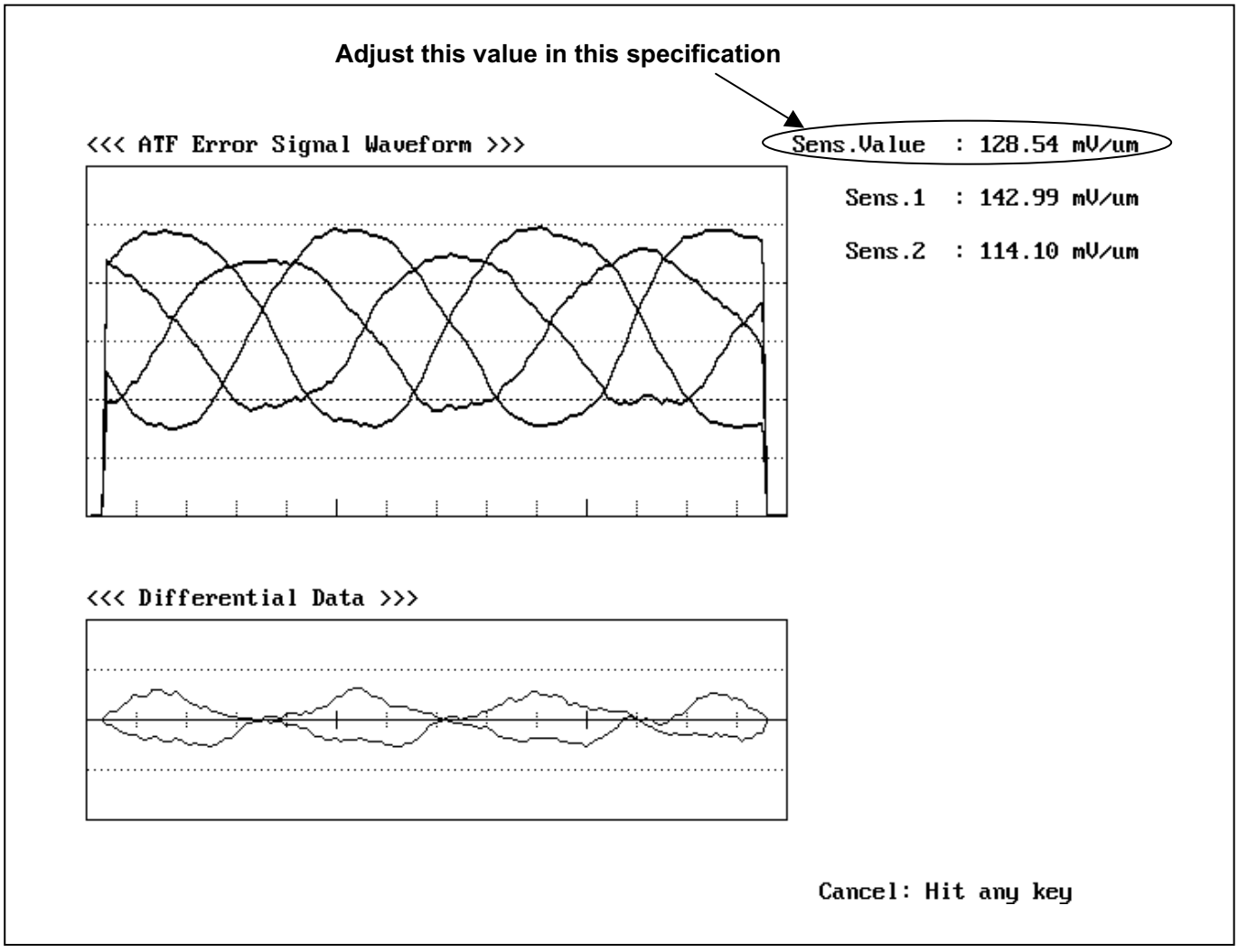
1. Connect the Test Point to clip of LISTA cable for ATF Error signal measurement.
2. Open the SERVO ADJUST menu on Service menu and select the EVR " A04:PB GAIN P ".
3. Playback the LISTA alignment tape.
4. Select the "**<6> ATF Error Signal Monitor" on** the LISTA main menu and after appear the message " 1.2% Speed… " , press ENTER key, then sensitivity value as real time and waveform appear on the screen as shown as figure below.
5. Adjust EVR " A04 PB GAIN P " so that the sensitivity value is within specification.
6. After finish this adjustment, press ESC key to exit to the main menu.



## 5-37. LISTA Sensitivity Adjustment (DV Compatibility)

| | |
|---|---|
| SPEC. | Sensitivity:130±30 (mV/um) |
| MODE | PLAY |
| TEST POINT | TP321 ATF ERR (SERVO Board:F1)<br>TP233 PB HSW(SERVO Board:F1)<br>TG510 GND (SERVO Board:F1) |
| ADJUSTMENT | A08:RP GAIN |
| TAPE | **NTSC:** VFM3581KM (LISTA)<br>**PAL:** VFM3681KM (LISTA) |

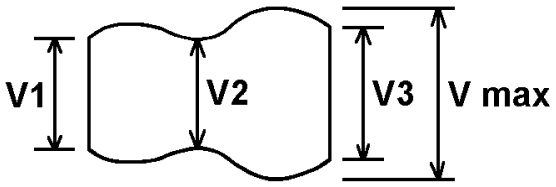
1. Connect the Test Point to clip of LISTA cable for ATF Error signal measurement.
2. Open the SERVO ADJUST menu on Service menu and select the EVR " A08:R/P GAIN ".
3. Playback the LISTA alignment tape.
4. Select the "**<6> ATF Error Signal Monitor" on** the LISTA main menu and after appear the message " 1.2% Speed… " , press ENTER key, then sensitivity value as real time and waveform appear on the screen as shown as figure below.
5. Adjust EVR " A08 R/P GAIN " so that the sensitivity value is within specification.
6. After finish this adjustment, press ESC key to exit to the main menu.



## 5-38. Self-Recording Playback Envelope Waveform Confirmation

| | |
|---|---|
| **SPEC** | V1/Vmax、V2/Vmax、V3/Vmax ≧ 0.8 |
| **TEST POINT** | TP16:R/P ENV (RF Board:H4)<br>TP1 :TRIG/RP HSW (RF Board:H4) |
| **ADJUSTMENT** | S1 and T1 Post Height |
| **MODE** | PLAY |
| **TAPE** | Blank Tape |
| **M.EQ** | Oscilloscope |
| **TOOL** | VFK1149(Post Driver) |

1. Record the color bar signal.
2. Play back the recorded portion and confirm that the envelope output is within specification
3. If out of specification, perform the Envelope Waveform and LISTA adjustment again.



# 6. Mechanical Parts Replacement and Adjustment Procedures

## GENERAL

When mechanical parts are replaced, pay attention to the following notes.

1. Turn power off before replacing any part.
2. If any adjustment is required after replacing parts, perform the required adjustments.
3. Use proper fixture tools.
4. Make sure to clean the parts after replacement, Also when the mechanical parts are replaced, follow the replacement procedure.

## 6-1. Cylinder Unit Replacement

**(Removal)**

1. Remove the T1 Guide and Cleaning Arm Unit (Refer to item 11-8).
2. Disconnect the connector P5002 and P5003 on the Head Buffer board. And remove the screw, which is fixed with flexible cable.

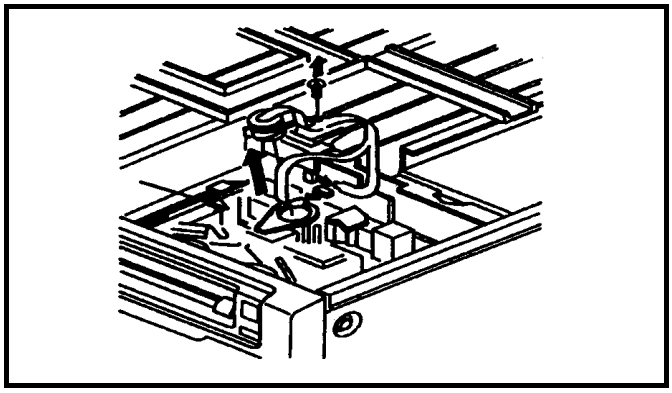


Fig. 6-1-1

**Note:** Be careful when removing the flexible cable from the connector. Refer to the way to remove the connector as shown in Figure 6-1-2.

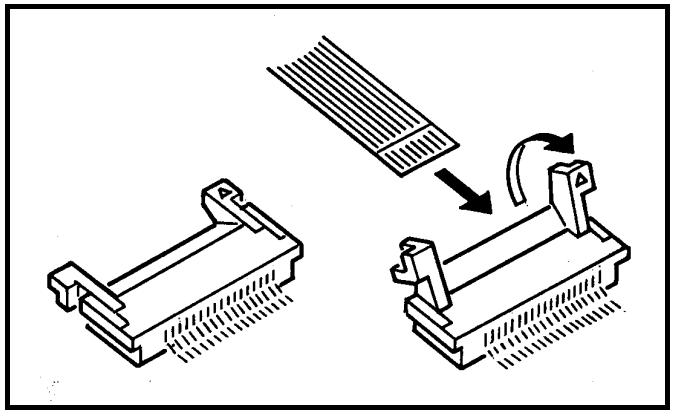


Fig. 6-1-2

3. Disconnect the connector P33 on Mech I/F P.C.Board at bottom of VTR. Then remove 3 screws (with spring) from the Cylinder unit, and remove the Cylinder unit without touching any mechanical part.

**Note:** Do not touch the cylinder surface by finger directly.

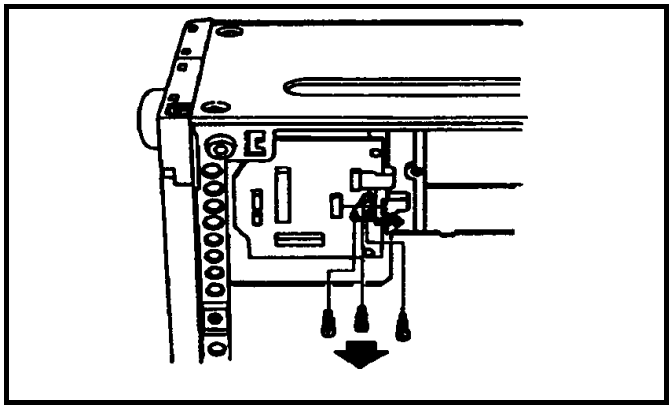


Fig. 6-1-3

**(Installation)**

1. Install a Cylinder unit as reverse order of its removal.

**Note:** Set the Mechanical Chassis pins are matched with the specified cylinder holes on the bottom of the cylinder.

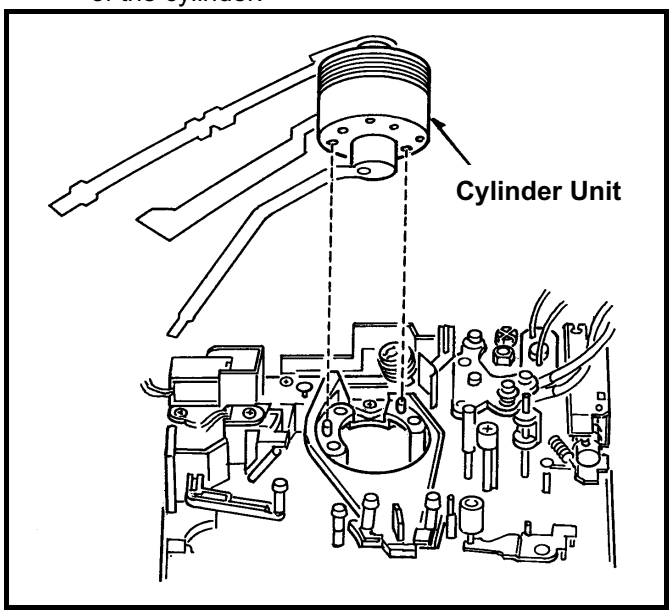



Fig. 6-1-4

2. After installing T1 Guide, T1 Guide position adjustment is necessary (Refer to adjustment procedure of item 6-1-3).

## 6-1-2. Cleaning Arm Unit Replacement

**(Removal)**

1. Unscrew the 2 screws (A) to remove the T1 Guide as shown in Figure 6-1-5.
2. Pick up the tip portion (B) of Cleaning Arm Unit and remove the spring from Cleaner Arm Unit. Then remove the Cleaning Arm Unit as shown in Figure 6-1-5.

**(Installation)**

1. Install the cleaning Arm Unit, then hang the spring on Cleaning Arm Unit.
2. Install the T1 Guide and tighten 2 screws (A).
3. Press the iron core of the Cleaner Solenoid and confirm that the Cleaner Roller is rotated when the cylinder is rotated.
4. T1 Guide position adjustment should be performed.

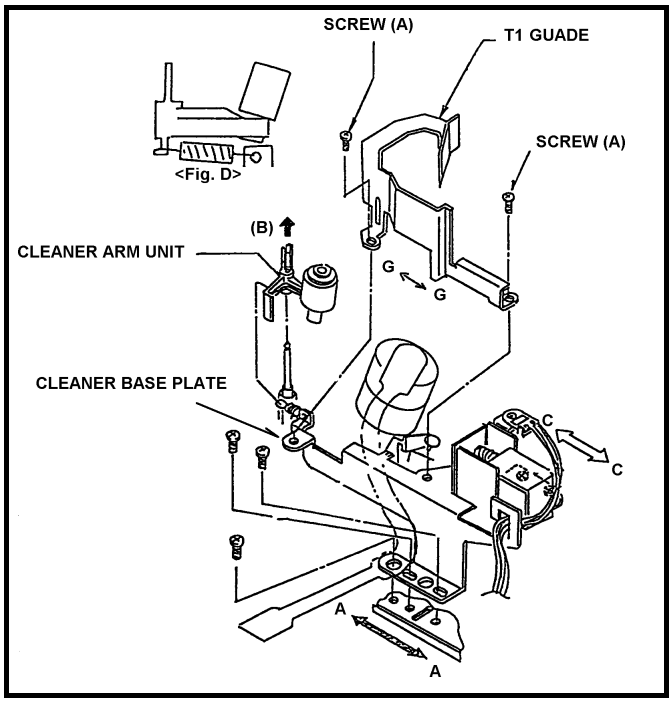



Fig. 6-1-5

## 6-1-3. T1 Guide Position Adjustment

Place the unit in Loading completion mode without tape.

**< How to Make the No Tape Loading >**

- Open the " SERVO ADJUST " menu in the Service menu.
- "Select the item " T TORQUE " and press the Search button for making the loading condition. And turn power to off.

1. Observe the clearance (B) between T1 Guide and T1 post as shown in Figure 6-1-6. And make sure that it is within 0.2 to 0.5mm.
2. If not, loosen the 2 screws (A) and adjust the position of T1 Guide by moving to arrow direction (G ⇔ G) so that the clearance (B) is within specification. And tighten the 2 screws (A).

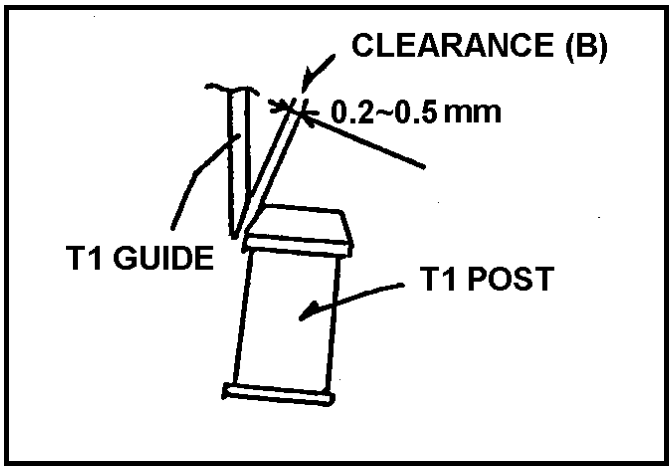
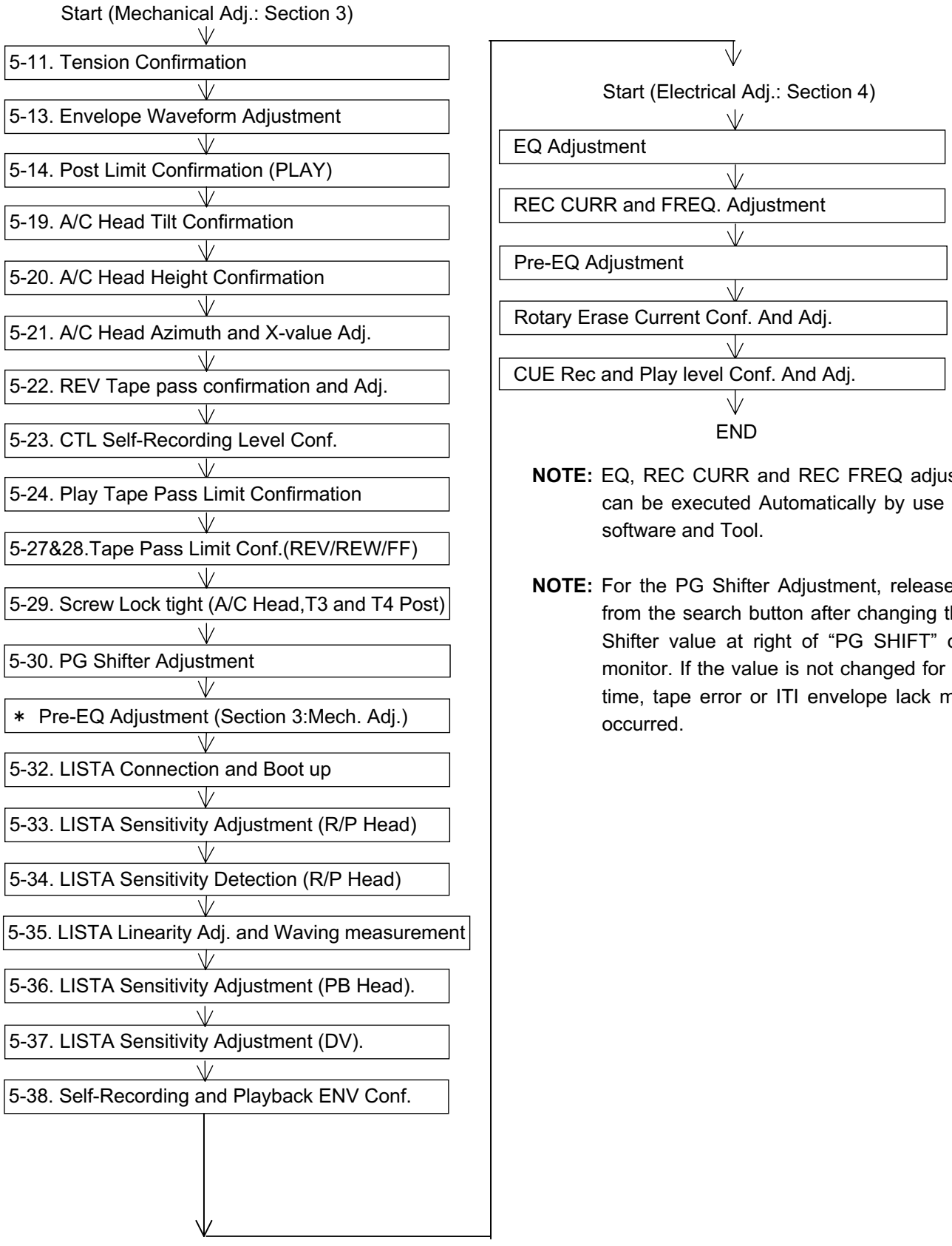



Fig. 6-1-6

## 6-1-4. Adjustment Flow Chart after Cylinder Unit Replacement

1. Adjust following items after Cylinder Unit replacement.


Start (Mechanical Adj.: Section 3)
5-11. Tension Confirmation
5-13. Envelope Waveform Adjustment
5-14. Post Limit Confirmation (PLAY)
5-19. A/C Head Tilt Confirmation
5-20. A/C Head Height Confirmation
5-21. A/C Head Azimuth and X-value Adj.
5-22. REV Tape pass confirmation and Adj.
5-23. CTL Self-Recording Level Conf.
5-24. Play Tape Pass Limit Confirmation
5-27&28.Tape Pass Limit Conf.(REV/REW/FF)
5-29. Screw Lock tight (A/C Head,T3 and T4 Post)
5-30. PG Shifter Adjustment
* Pre-EQ Adjustment (Section 3:Mech. Adj.)
5-32. LISTA Connection and Boot up
5-33. LISTA Sensitivity Adjustment (R/P Head)
5-34. LISTA Sensitivity Detection (R/P Head)
5-35. LISTA Linearity Adj. and Waving measurement
5-36. LISTA Sensitivity Adjustment (PB Head).
5-37. LISTA Sensitivity Adjustment (DV).
5-38. Self-Recording and Playback ENV Conf.
Start (Electrical Adj.: Section 4)
EQ Adjustment
REC CURR and FREQ. Adjustment
Pre-EQ Adjustment
Rotary Erase Current Conf. And Adj.
CUE Rec and Play level Conf. And Adj.
END

**NOTE:** EQ, REC CURR and REC FREQ adjustment can be executed Automatically by use AUTO software and Tool.

**NOTE:** For the PG Shifter Adjustment, release hand from the search button after changing the PG Shifter value at right of “PG SHIFT” on the monitor. If the value is not changed for a long time, tape error or ITI envelope lack may be occurred.

## 6-2. A/C Head Replacement

### 6-2-1. Replacement

※ Required tools:
Nut Driver (5.5m/m)(VFK1150)
Hex Driver (VFK1148)
Hex Wrench (VFK1190)

**(Removal)**

1. Remove the Top Plate.
2. Loosen the hex. screw (B) and remove the Nut (C). Pick up the Head Height Adjustment Spring and then remove the A/C Head Unit as shown in Figure
   **Point:** Memorize the height of Nut (C) before removing the Nut (C),

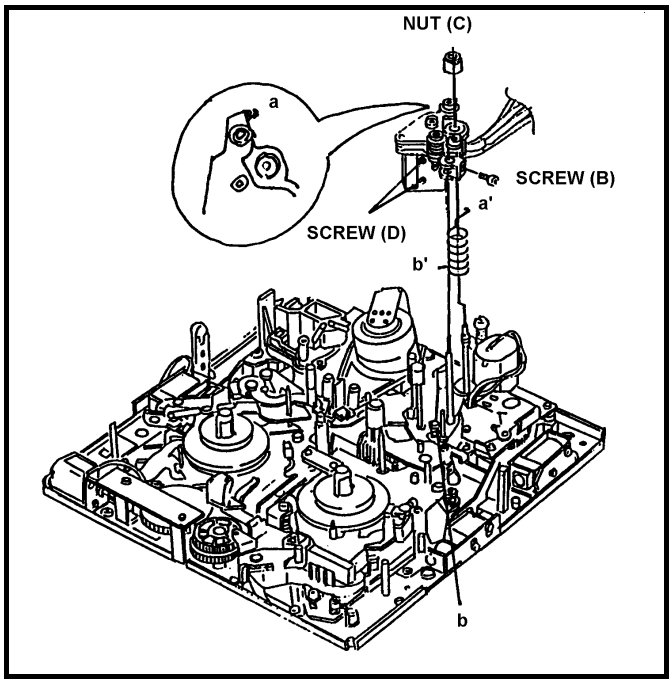



Fig. 6-2-1

3. Remove the 2 screws (A). and disconnect the 2 connectors P1 on the A/C Head I/F P.C.Board and P30 on the Mech I/F P.C.Board, and then remove the A/C Head from the A/C Head Plate.
4. Remove 2 screws (D) to remove the Shield Cover as shown in Figure 6-2-1.
5. Unsolder the lead wires as shown in Figure 6-2-3.

**Note:** When unsolder the lead wires, do not unsolder all at the same time.)

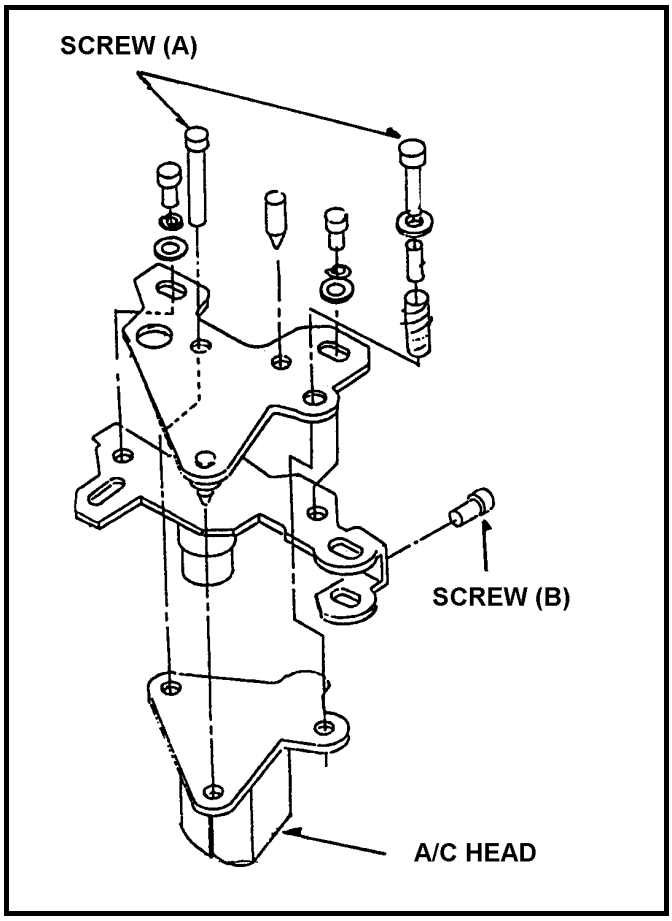



Fig. 6-2-2

**(Installation)**

1. Remove the Shield Case from the New A/C Head and solder the lead wires to New A/C Head (Refer to Figure 6-2-3).
2. Re-install the shield case to A/C Head.
3. Install the A/C Head to A/C Head Plate and tighten 2 screws (A) so that A/C Head is parallel to A/C Head Plate.
4. Install the A/C Head Unit.
5. Put on the Head Height Adjustment Spring and tighten the Nut (C).
6. Clean the surface of the A/C Head.
7. Perform the A/C Head adjustment.

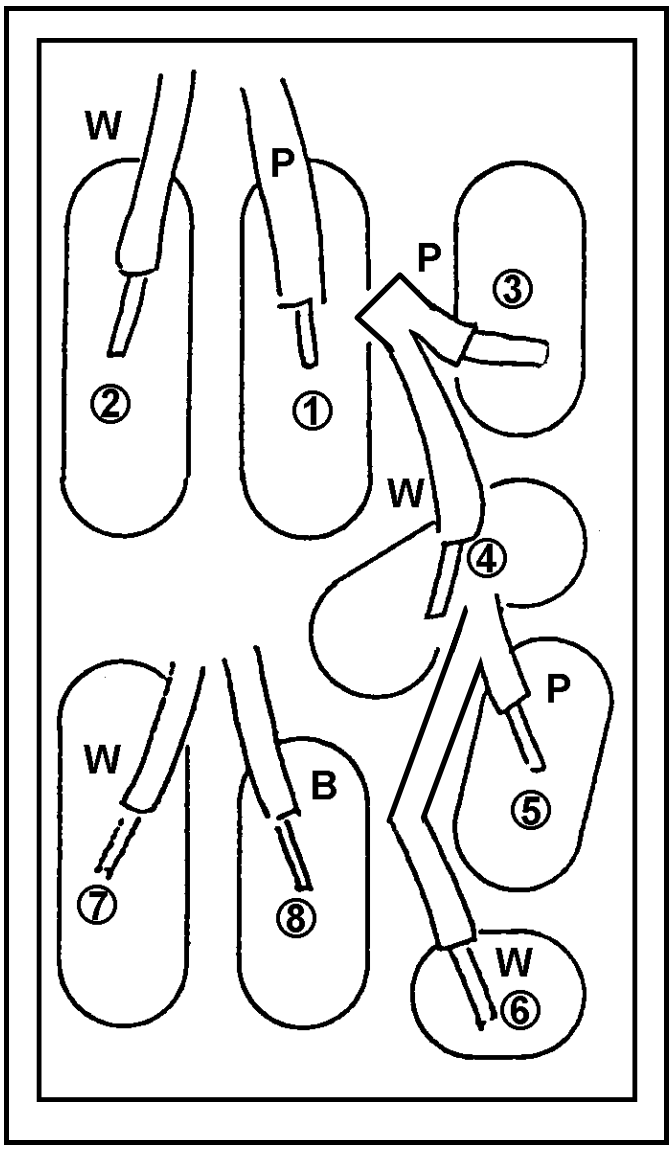
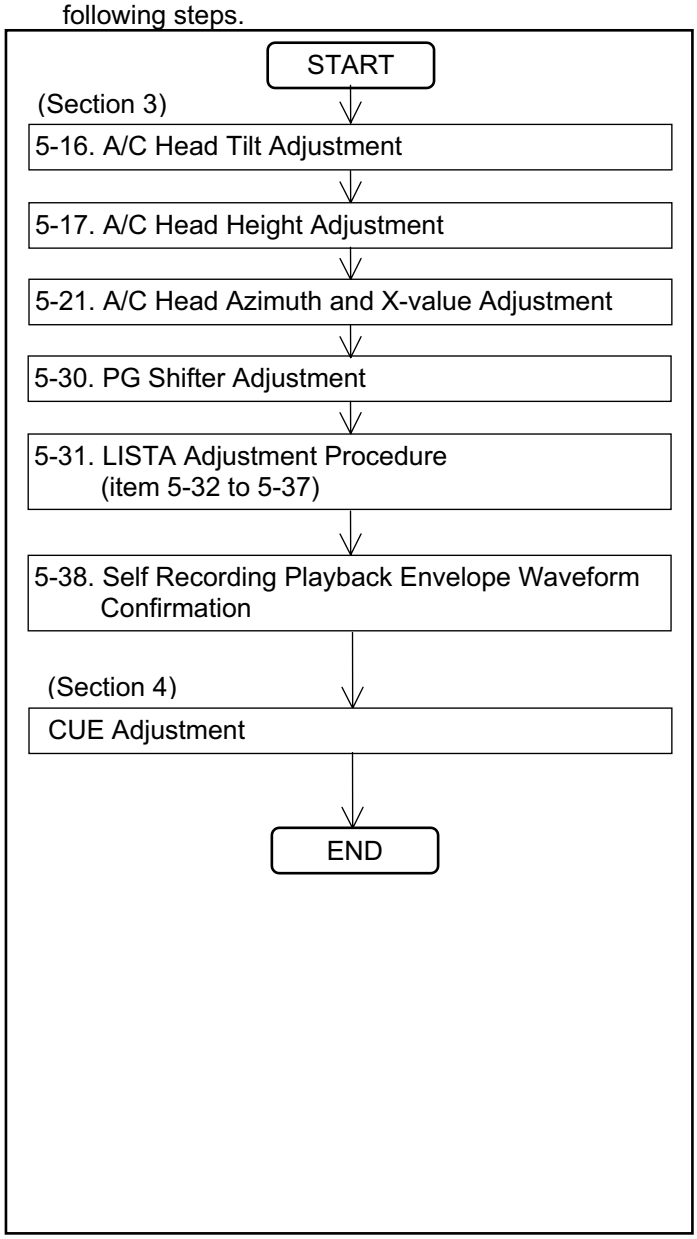



Fig. 6-2-3

| A/C Head Side | Cable Color | | Connector No. |
|---|---|---|---|
| 1 | PINK | YELLOW | P1 |
| 2 | WHITE | | |
| 3 | PINK | RED | |
| 4 | WHITE | | |
| 5 | PINK | GREEN | |
| 6 | WHITE | | |
| 7 | WHITE | YELLOW | P30 |
| 8 | BLACK | | |

## 6-2-2. Adjustment Flowchart After A/C Head Replacement

1. After installing, Mechanical and Electrical Adjustments should be performed.
   **NOTE:** The **hex screw (B)** is kept loose until the A/C Head Height Adjustment is completed.
2. After replacing the A/C Head, perform the following steps.



## 6-3. Supply Reel Rotor Unit and Take Up Reel Rotor Unit Replacement

**(Removal)**

1. Remove the Top Panel (Refer to item [2-1. Removal of Top Panel]).
2. Remove the Front Loading Unit (Refer to item [2-5. Removal of Front Loading Unit]).
3. Remove the Bottom Panel (Refer to item [2-2. Removal of Bottom Panel]).
4. Disconnect the connector P34 and P35 on the Mech I/F P.C.Board as shown in Figure 6-3-1.
5. Move the S1 post to loading direction by manual ejecting method until the screw (C) can removing position.
6. Confirm the supply and Take Up Brake are not release.
7. Press the iron core of M stopper solenoid to release the M stopper.
8. Remove the 4 screws (C), (D) and (E) as shown in Figure 6-3-2.
9. Remove the Supply and Take Up Reel Rotor Unit and Reel Outer Rail.

   **Note:** Memorized the groove position of Reel Base, which inserted the pin of Drive Arm Unit.

**(Installation)**

1. Through in the Reel Outer Rail to New Supply and Take Up Reel Rotor Unit.
2. Hang on the Reel Rotor Unit to Reel Inner Rail and Install the Reel Rotor Unit then the pin of Drive Arm Unit should be matched with groove position of Reel Base as shown in Figure 6-3-3.
3. Install the 4 screws (C), (D) and (E).
4. Confirm that the Reel Rotor Unit moving smoothly on the Rail by hard.
5. Move the Reel Rotor Unit to front side by hand and then pull up the iron core of M stopper solenoid for operating M stopper.
6. Set the unloading condition by turn the Emergency shaft counter-clockwise.
7. Connect the Flexible Cable to Connector P34 and P35 on the Mech I/F P.C.Board.
8. Adjust the Motor Torque Offset value (Refer to item 4-1 of section 4).
9. Confirm that the Tension value on playback mode (Refer to item 5-11).

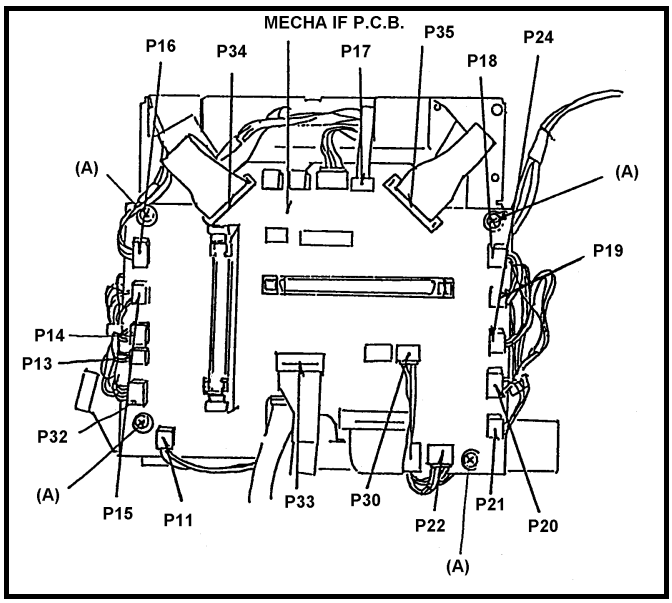



Fig. 6-3-1 Connection of S & T Reel Rotor Unit

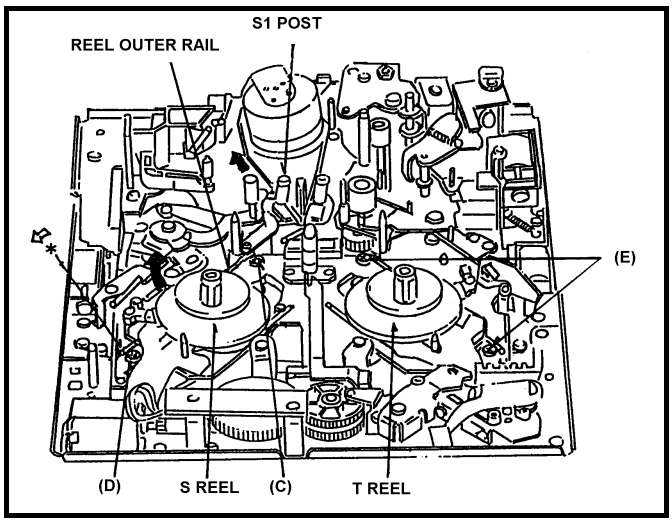



Fig.6-3-2 Removal of S & T Reel Rotor Unit

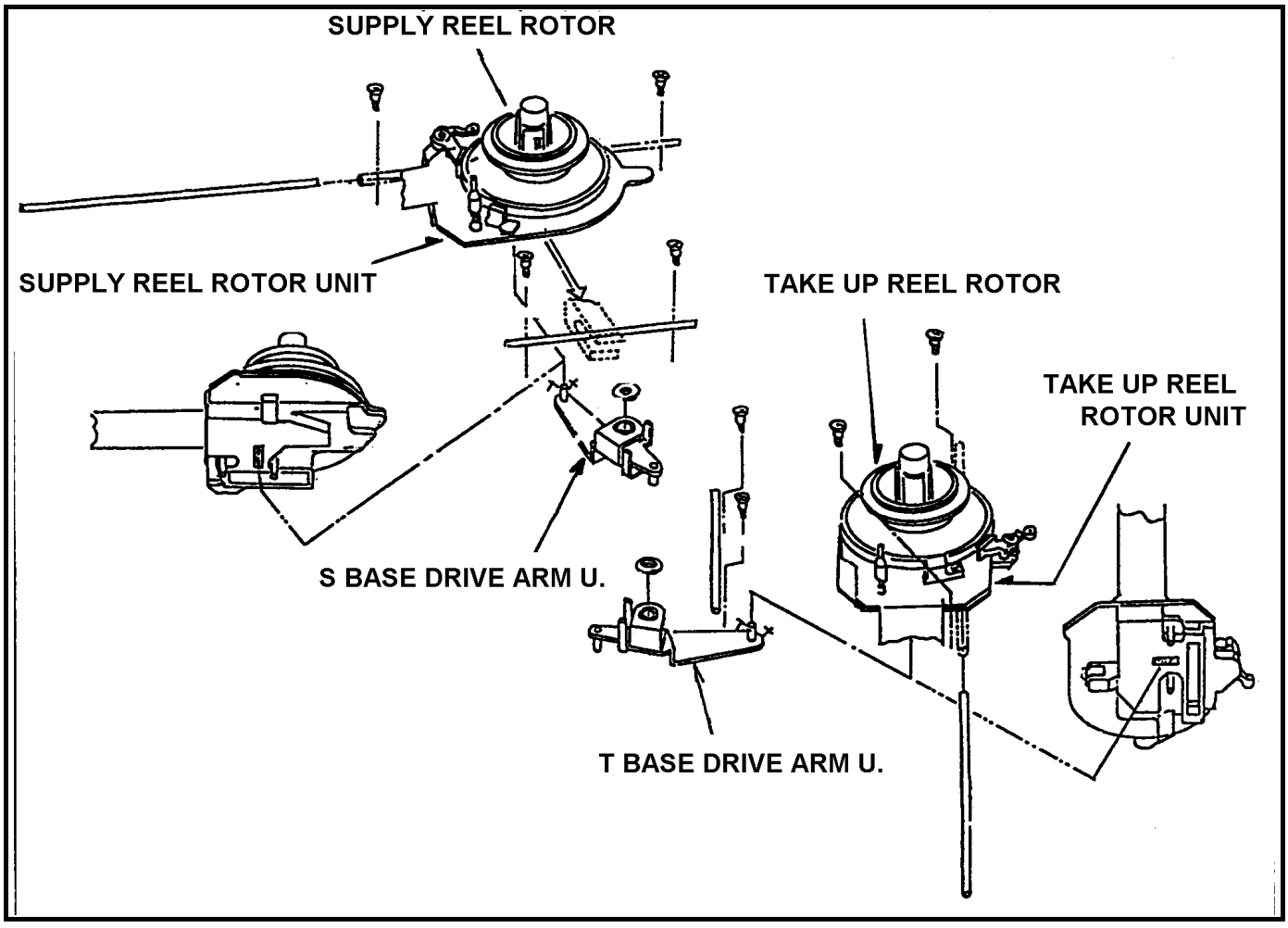



Fig.6-3-3 Installation of S & T Reel Rotor Unit

## 6-4. Supply and Take Up Brake Arm Unit Replacement

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Press the iron core of Brake Solenoid for release the Brake.
4. Remove the cut washers (A) and remove the supply and Take Up Brake Arm Unit as shown in Figure 6-4-1.

**(Installation)**

1. When install the new Brake Arm Unit first, hang on the Brake Arm Spring as shown in Figure 6-4-1.
2. Follow the previous steps in reverse order.
3. Main Brake Torque confirmation is required (Refer to item 5-3).
4. Confirm that the Tension value on the Playback mode (Refer to item 5-11).

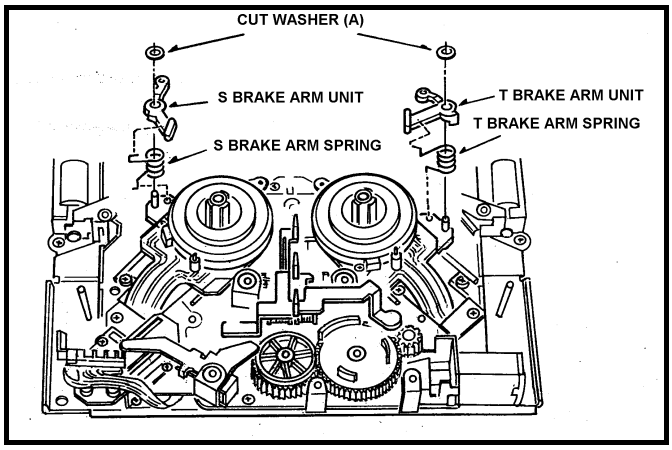



Fig.6-4-1 Removal of S & T Break Arm Unit

## 6-5. Supply Brake Solenoid Replacement and Adjustment

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Remove the Bottom Panel.
4. Disconnect the connector P15 on the Mech I/F P.C.Board as shown in Figure 6-3-1.
5. Unscrew the 2 screws (A) and remove the Supply Brake Solenoid Base Unit as shown in Figure 6-5-1.
6. Unscrew the 2 screws (B) and remove the supply Brake Solenoid from Supply Brake Solenoid Base Unit as shown in Figure 6-10-1.

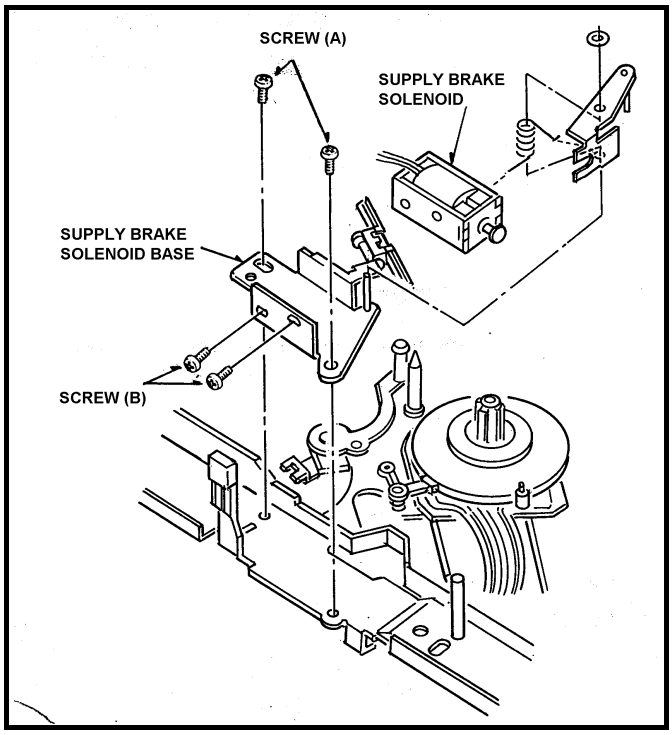



Fig. 6-5-1 Removal of Supply Brake Solenoid

**(Installation)**

1. Install the new supply Brake Solenoid follow the removal steps in reverse order.

**Note:** Hang on the Supply Brake Spring as shown in Figure 6-6-1.

2. Adjustment is required after installation.

**(Adjustment)**

1. Place the reels in the M cassette size position.
2. Observe the clearance (A) between Brake pad and it's turntable as shown in Figure 6-5-2. And make sure that it is within 0.2 to 0.5mm.
3. If not, loosen the 2 screws (A), which fixed supply and Take Up Brake Solenoid Unit. And adjust the position of Brake Solenoid Unit by moving arrow direction so that the clearance (A) is within specification. And tighten the 2 screws (A).
4. After adjustment, change the reel position to S and L cassette size, and confirm that the clearance (A) is within specification.

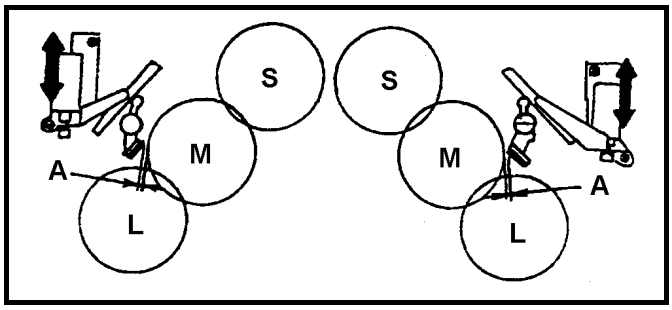



Fig.6-5-2 Brake Solenoid Adjustment

## 6-6. Take Up Brake Solenoid Replacement and Adjustment

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Remove the Bottom Panel.
4. Disconnect the connector P18 on the Mech I/F P.C.Board. as shown in Figure 6-3-1.
5. Unscrew the 2 screws (A) and remove the Take Up Brake Solenoid Base Unit as shown in Figure 6-6-1.
6. Unscrew the 2 screws (B) and remove the Take Up Brake Solenoid from Take Up Brake Solenoid Base Unit as shown in Figure 6-6-1.

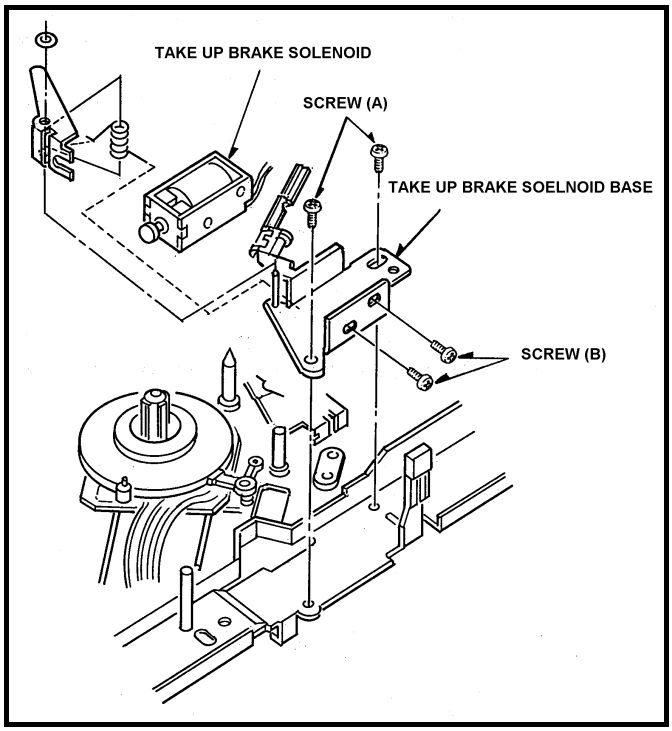



Fig.6-6-1 Removal of Take Up Brake Solrnoid

**(Installation)**

1. Install the new Take up Brake Solenoid follow the removal steps in reverse order.

**Note:** Hang on the Take up Brake Spring as shown in Figure 6-6-1.

2. After installation, position adjustment should be performed as follows.

**(Adjustment)**

Please adjust the position of Take up Brake Solenoid Unit follow the adjustment procedure, which is described item 6-5.

## 6-7. Pinch Solenoid Replacement

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Remove the Bottom Panel.
4. Disconnect the connector P20 on the Mech I/F P.C.Board as shown in Figure 6-3-1.
5. Unscrew the 2 screws (A) and remove the Pinch Solenoid Unit as shown in Figure 6-7-1.
6. Unscrew the 2 screws (B) and remove the Pinch Solenoid Angle as shown in Figure 6-7-1.
7. Unscrew the 2 screw s (C) and remove the Pinch Solenoid from the Pinch Solenoid Base.

**(Installation)**

1. Install the new Pinch Solenoid follow the removal steps in reverse order.
2. After installation, Pinch Solenoid Position Adjustment is required (Refer to item 5-2).

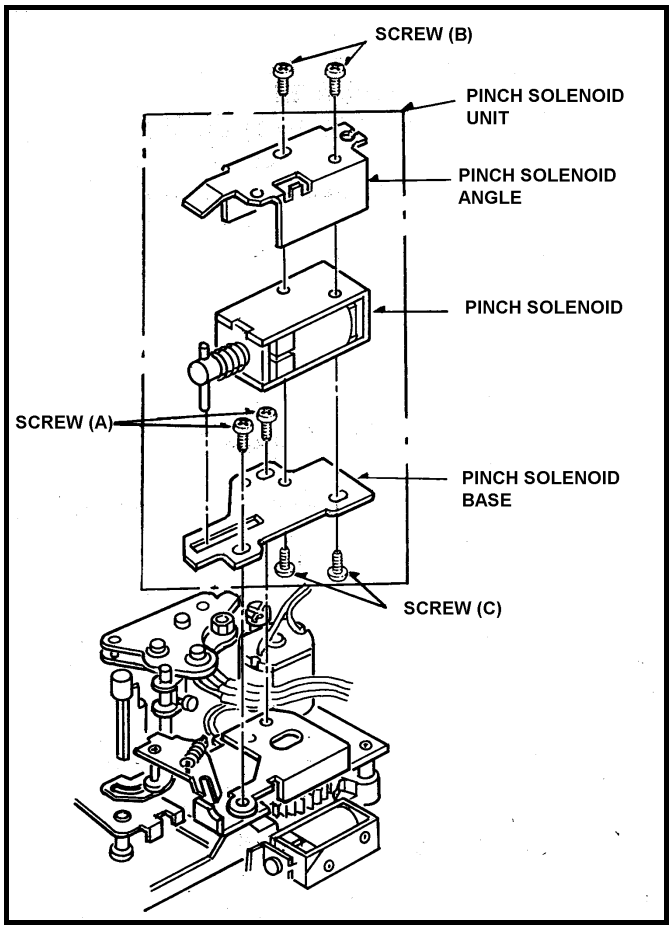



Fig.6-7-1 Removal Pinch Solenoid

## 6-8. Pinch Arm Unit Replacement

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Remove the Bottom Panel.
4. Disconnect the connector P20 on the Mech I/F P.C.Board as shown in Figure 6-3-1.
5. Remove the Pinch Solenoid Unit (Refer to item 6-9, then hang off the Pinch Solenoid Lever as shown in Figure 6-8-1.
6. Remove the cut washer (A) and remove the Pinch Solenoid Lever as shown in Figure 6-8-1.
7. Remove the cut washer (B) and remove the Pinch Arm Unit as shown in Figure 6-8-1.

**(Installation)**

Install the new Pinch Arm Unit follow the removal steps in reverse order then Pinch Solenoid Position Adjustment is necessary (Refer to item 5-2).

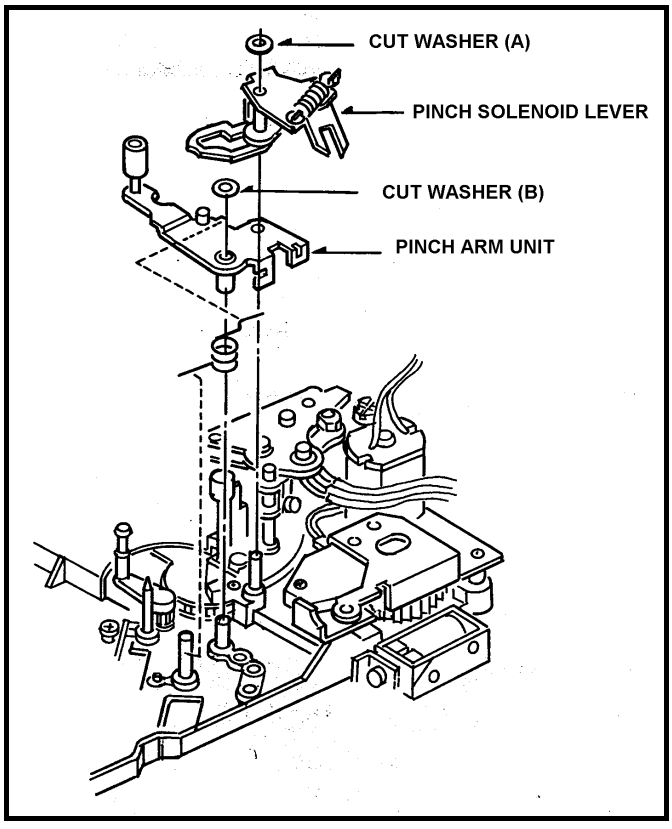



Fig.6-8-1 Removal of Pinch Arm Unit

## 6-9. Loading Motor Unit Replacement

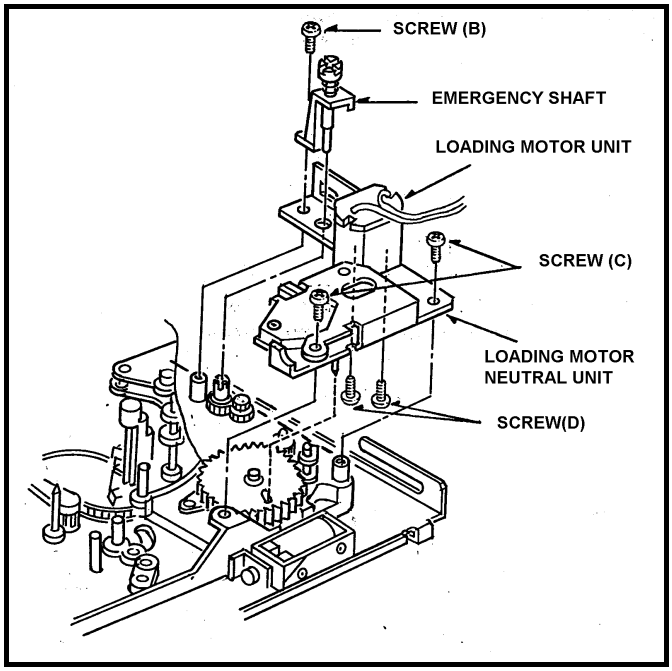
**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Remove the Bottom Panel.
4. Disconnect the connector P21 on Mech I/F P.C.Board as shown in Figure 6-3-1.
5. Remove the Pinch Solenoid Unit (Refer to item 6-7).
6. Remove the Pinch Solenoid Lever. (Refer to item 6-8).
7. Unscrew the screw (B), and remove the Emergency Shaft as shown in Figure 6-9-1.
8. Unscrew the 2 screws (C) and remove the Loading Motor Neutral Unit as shown in Figure 6-9-1.
9. Unscrew the 2 screws (D) and remove the Loading Motor Unit as shown in Figure 6-9-1.

**(Installation)**

1. Install the new Loading Motor Unit to Loading Motor Neutral Unit by tightening 2 screws (D).
2. Install the Loading Motor Neutral Unit by tightening the 2 screws (C), then be careful that the pin of Mode SW Unit should be matched to groove position of main Cam Gear.
3. Install the Emergency Shaft by tightening the screw (B).
4. Install the Pinch Solenoid Unit and after installation it, Pinch Solenoid Position adjustment is required. (Refer to item 5-2).
5. Connect the connector P21 on the Mech I/F P.C.Board. as shown in Figure 6-3-1.

Fig. 6-9-1 Removal of Loading Motor




## 6-10. Mode Select Switch Unit Replacement

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Remove the Bottom Panel.
4. Disconnect the connector P22 on the Mech I/F P.C.Board as shown as Figure 6-3-1.
5. Remove the Pinch Solenoid Unit and Loading Motor Neutral Unit (Refer to item 6-9).
6. Remove the screw (D) and remove the Mode Select Switch Unit from Loading Motor Neutral Unit as shown in Figure 6-10-1.

**(Installation)**

1. Install the New Mode Select Switch Unit follow the removal steps in reverse order (Please refer to item [6-9. Loading Motor Unit Replacement]).

**Note:** Be careful the pin of Mode Switch Unit should be matched to groove of Main Cam Gear.

2. After install the Pinch Solenoid Unit, Pinch Solenoid Position adjustment is required (Refer to item 5-2).

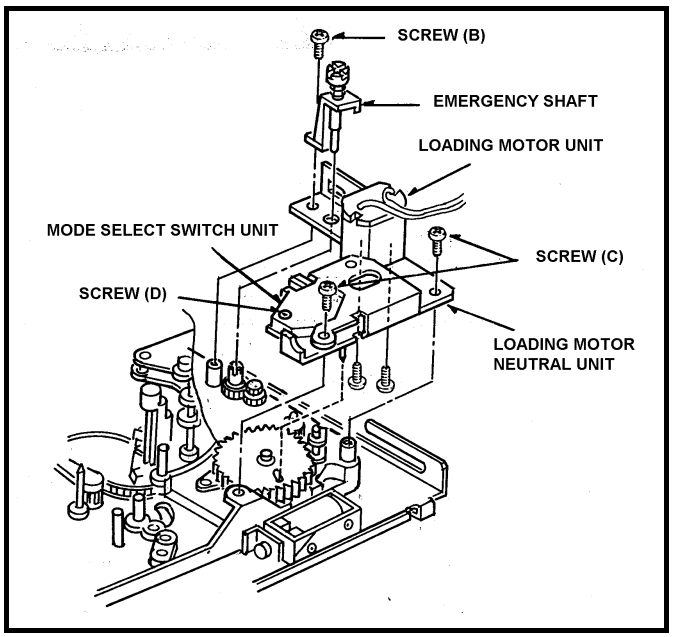



Fig.6-10-1 Removal of mode Select Switch Unit

## 6-11. Main Cam Gear Replacement

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Remove the Pinch Solenoid Unit (Refr to item 6-7) and Loading Motor Neutral Unit (Refer to item 6-9).
4. Remove the Main Cam Gear as shown in Figure 6-11-1.

**(Installation)**

1. Install the Main Cam Gear, then the pin of Main Cam Arm Unit (※) should be matched with the groove position of Main Cam Gear as shown in Figure 6-11-1.
2. Follow the removal steps in reverse order.
3. After installation, Pinch Solenoid Position Adjustment is required (Refer to item 5-2).

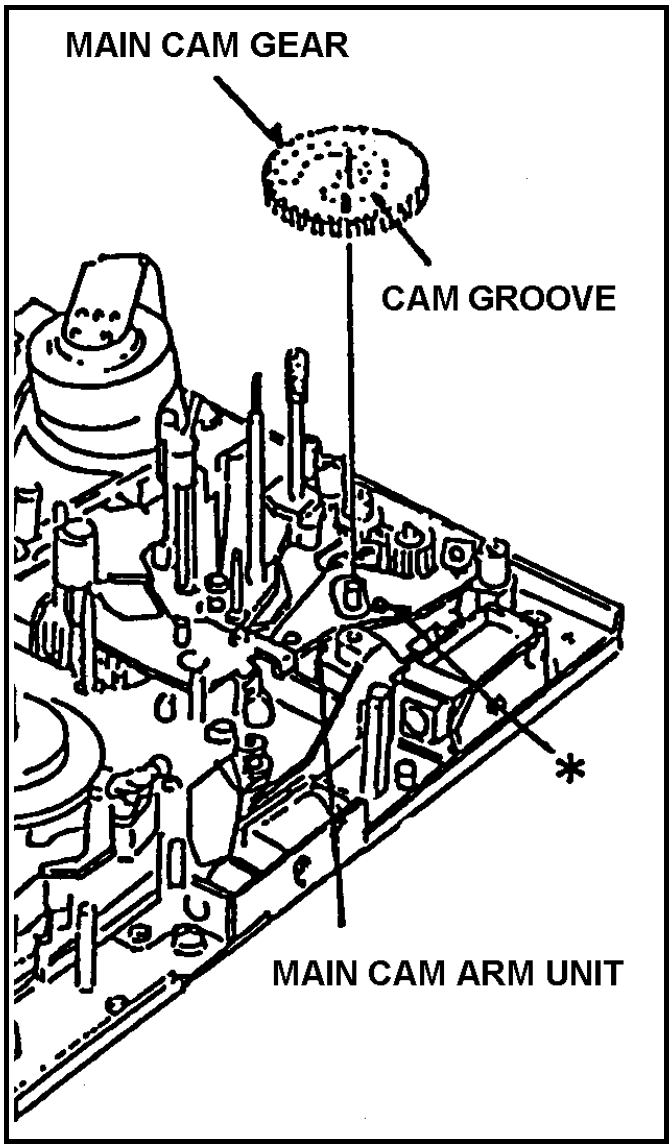



Fig.6-11-1 Removal of Main Cam Gear

## 6-12. S5 Post Base Unit Replacement

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Unscrew the screw (A) and remove the S5 Post Base Unit as shown in Figure 6-12-1.

**(Installation)**

1. Install theS5 post Base Unit follow the removal steps in reverse order, then be careful the S5 Post Base Unit is install to mech chassis as shown in Figure 6-12-1.
2. After installation, Post Height pre-adjustment (Refer to item 5-4) and Linearity adjustment (Refer to item 5-12 [ Tape Pass Adjustment Procedure ]) should be performed.

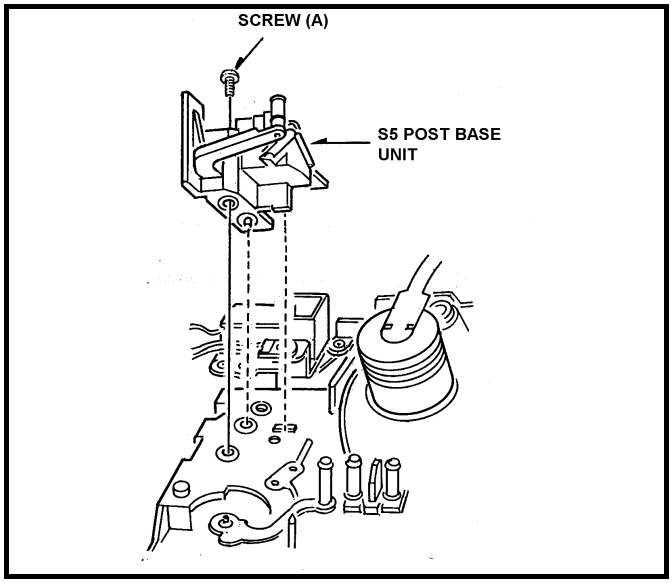



Fig.6-12-1 Removal of S5 Post Base Unit

## 6-13. Tension Arm Unit Replacement

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Remove the Cut Washer (A) and hang off the Tension Regi Spring, then remove the Tension Arm Unit as shown in Figure 6-13-1.

**(Installation)**

1. Install the new Tension Arm Unit follow the removal steps in reveres order.
2. After installation, Tension Arm Adjustment should be performed the following steps.

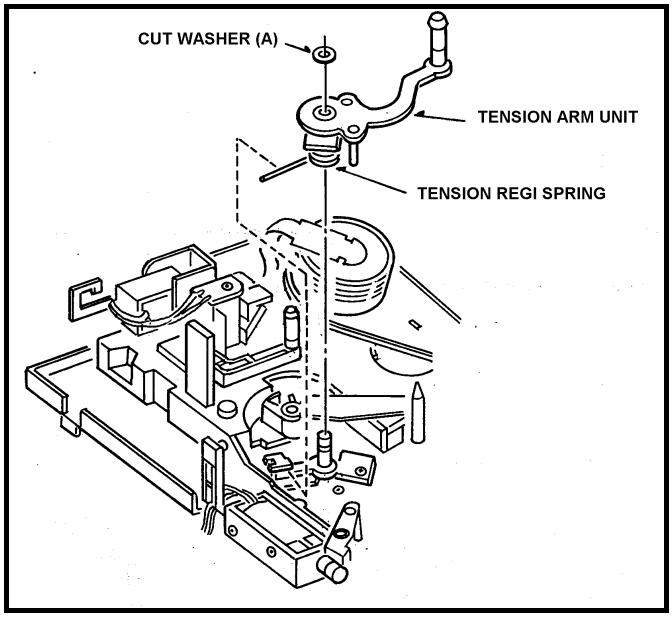
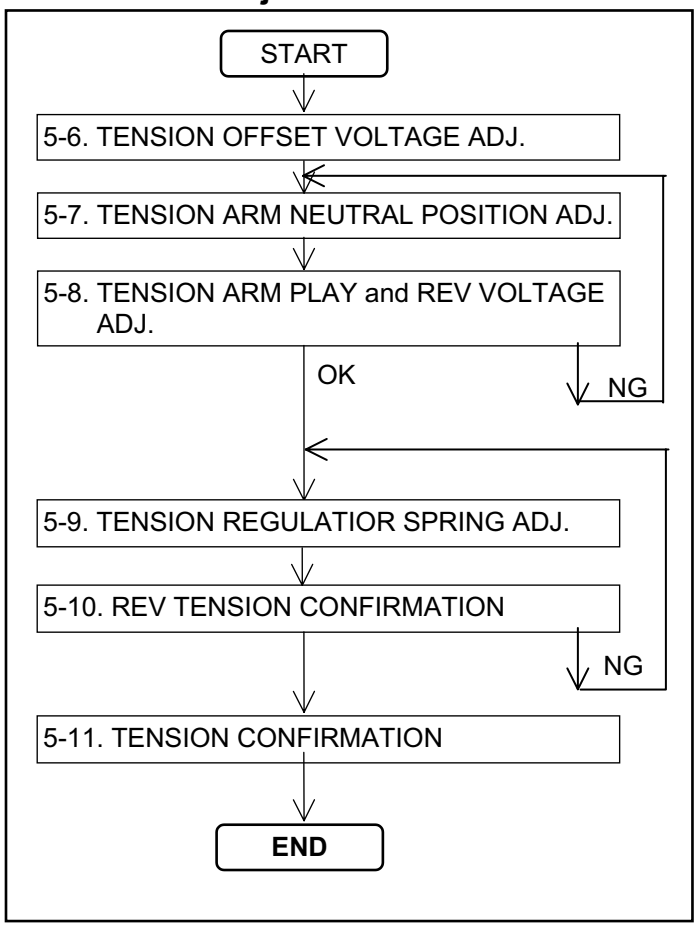



Fig.6-13-1 Removal of Tension Arm Unit

### Tension Arm Adjustment Flowchart



## 6-14. S1 Post Loading Arm Unit Replacement and Adjustment

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Remove the S5 Post Base Unit (Refer to item 6-12).
4. Remove the Tension Arm Unit(Refer to item 6-13).
5. Unscrew the screw (A) and remove the S1 Post from Loading Rail as shown in Figure 6-14-1.
6. Remove the Cut Washer (B) and remove the S1 Loading Arm Unit as shown in Figure 6-14-1.

**(Installation)**

1. Install the new S1 Loading Arm Unit follow the removal steps in reverse order, then S1 Post Loading Arm Unit Phase Adjustment should be performed as follows.
2. After installation, confirm that the S1 Post moving smoothly on the Loading Rail.
3. Tension Arm (Refer to item 5-5), Post Height Pre-Adjustment (Refer to item 5-4) and Linearity Adjustment. (Refer to item 5-12 [ Tape Pass Adjustment Procedure]) should be performed.

**(Adjustment)**

1. When install the S1 Post Loading Arm Unit, then the hole (A) should be matched hole (B) as shown in Figure 6-14-1.

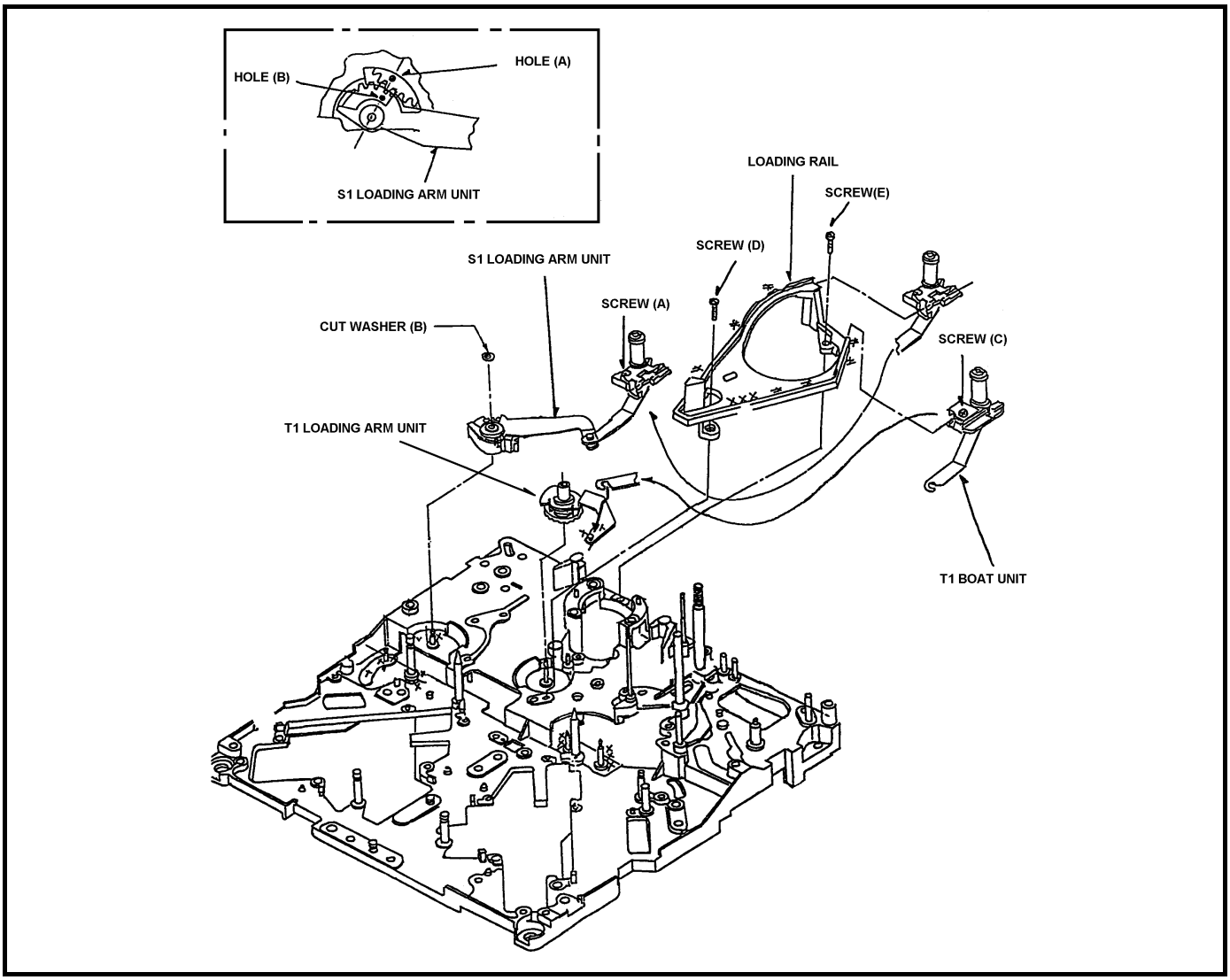



Fig.6-14-1 Removal of S1 Post Loading Arm Unit

## 6-15. T1 Boat Unit Replacement

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Unscrew the screw (C) and remove the T1 Post from Loading Rail as shown in Figure 6-14-1.
4. Hang off the T1 Boat Unit from T1 Loading Arm Unit as shown in Figure 6-14-1.

**(Installation)**

1. Install the new T1 Boat Unit follow the removal steps in reverse order.
2. After installation confirm that the T1 Post moving smoothly on the Loading Rail.

Linearity adjustment (Refer to item 5-12 [ Tape Pass Adjustment Procedure ]) should be performed.

## 6-16. T1 Loading Arm Unit Replacement and Adjustment

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Remove the cylinder Unit (Refer to item 6-1).
4. Move the T1 Post to loading direction by manual ejecting method until the screw (D) can be removal position as shown in Figure 6-14-1.
5. Unscrew the 2 screws (A) and (C), then remove the S1 and T1 Post from Loading Rail as shown in Figure 6-14-1.
6. Unscrew the 2 screws (D) and (E), then remove the Loading Rail as shown in Figure 6-14-1.
7. Remove the T1 Loading Arm Unit as shown in Figure 6-14-1.

**(Installation)**

1. Install the T1 Loading Arm Unit follow the removal steps in reverse order, then Phase Adjustment should be performed as follows.

**Note:** This replacement should be performed simultaneously, replacement of Cylinder Unit. It is convenience for Replacement of T1 Loading Arm Unit.

**(Adjustment)**

1. When install the T1 Loading Arm Unit, then the hole (A) should be matched hole (B) as shown in Figure 6-16-1.
2. After installation confirm that the S1 and T1 Post moving smoothly on the Loading Rail.
3. Post Height Pre-adjustment (Refer to item 5-3) and Linearity adjustment (Refer to item 5-12 [ Tape Pass Adjustment Procedure ]) should be performed.

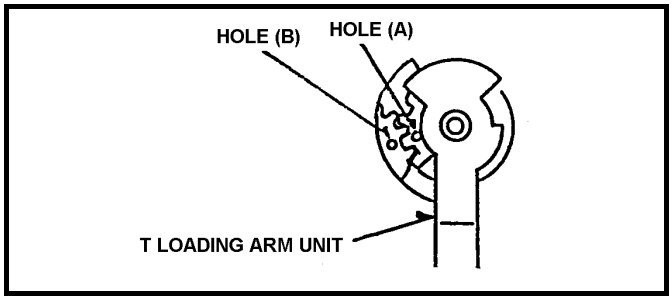



Fig.6-16-1 Phase Adjustment of T1 Lording Arm Unit

## 6-17. Cleaner Solenoid Replacement and Adjustment

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Disconnect the connector P11 on the Mech I/F P.C.Board.
4. Unscrew the 2 screws (A) and remove the Cleaner Solenoid Unit as shown in Figure 6-17-1.
5. Unscrew the 2 screws (B) and remove the Cleaner Solenoid as shown in Figure 6-17-1.

**(Installation)**

1. Install the new Cleaner Solenoid follow the removal steps in reverse order.
2. After installation, Cleaner Solenoid Position adjustment should be performed as follows.

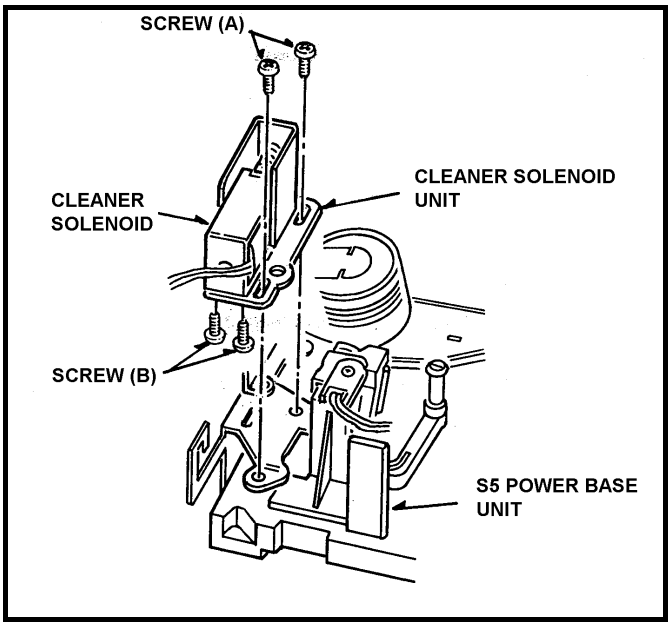



Fig.6-17-1 Removal of Cleaner Solenoid

## 6-17-1. Cleaner Solenoid Position Adjustment

※ Tools Required : Eccentric Driver (VFK0357)

1. Press the iron core of Cleaner Solenoid.
2. Observe the clearance (D) between Cleaning Arm Unit and Cleaner Base Plate as shown in Figure 6-15-2. And make sure that it is within 0.5 to 0.7mm.
3. If not, loosen the 2 screws (A) and adjust the position of Cleaner Solenoid Unit by moving arrow direction (C⇔C) using the Eccentric drive so that the clearance (D) is within specification. And tighten the 2 screws.
4. After adjustment, confirm that as follow.
5. Press the iron core of Cleaner Solenoid and released it, then the Cleaning Roller is return to original position.
6. Press the iron core of the Cleaner Solenoid and confirm that the Cleaner Roller is rotated, when the Cylinder is rotated by hand.

**Note:** If remove the cleaner Base Plate, Cleaner roller Position adjustment should be performed.

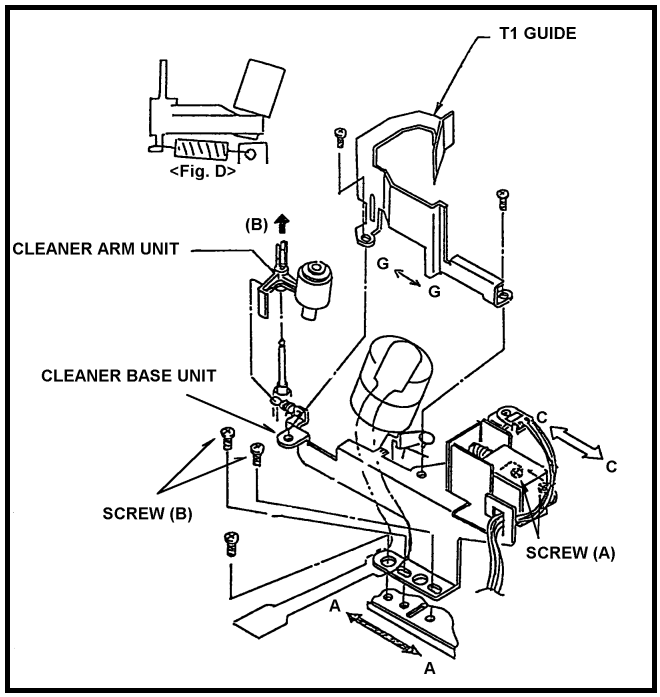



Fig.6-17-2 Cleaner Solenoid Position Adjustment (1)

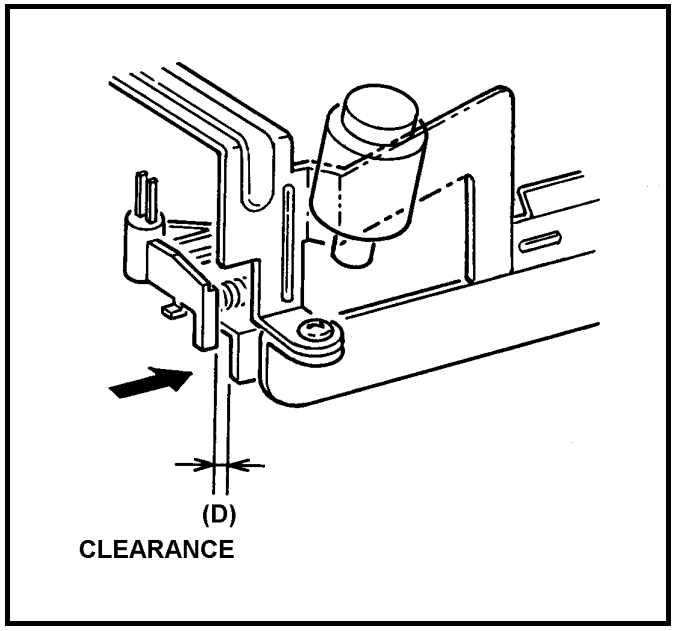



Fig.6-17-3 Cleaner Solenoid Position Adjustment (2)

## 6-17-2.Cleaner Roller Position Adjustment

※ Tools Required : Eccentric Driver (VFK0357)

1. Observe the clearance (A) between Cleaner Roller and cylinder Unit as shown in Figure 6-15-3. And make sure that it is within 1.0 to 1.2mm.
2. If not, loosen the 2 screws (B) and adjust the position of Cleaner Base Plate by moving arrow direction (A ⇔ A) using the Eccentric driver so that the clearance (A) is within specification. And tighten the 2 screws (B).

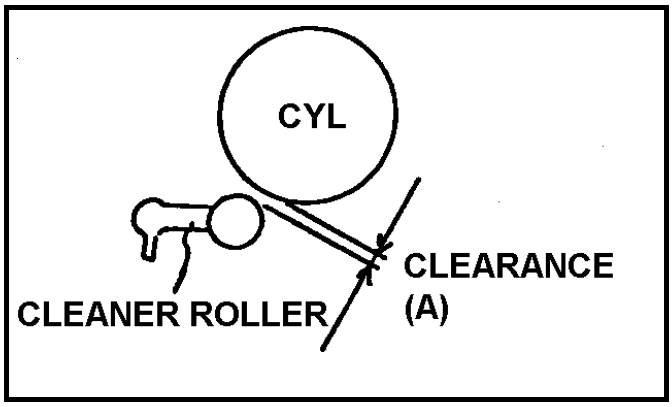



Fig.6-17-4 Cleaner Roller Position Adjustment

## 6-18. M-Stopper Solenoid Replacement and Adjustment

**(Removal)**

1. Remove the Top Cover.
2. Remove the Front Loading Unit.
3. Remove the connector P24 on the Mech I/F P.C.Board as shown in Figure 6-3-1..
4. Unscrew the 4 screws (A) and (B) and remove the M-Stopper Solenoid as shown in Figure 6-18-1.

**(Installation)**

1. Install the new M-Stopper Solenoid follow the removal steps in reverse order.
2. After installation, position adjustment should be performed as follows.

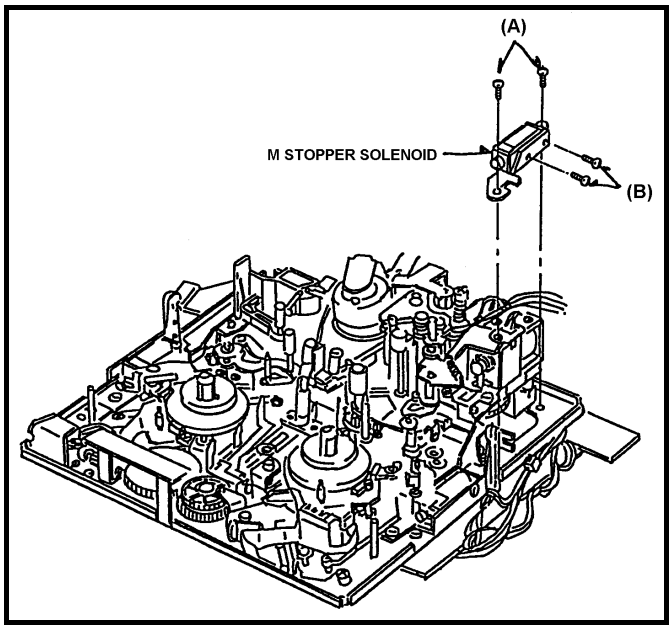



Fig.6-18-1 Removal of M-Stopper Solenoid

**(Adjustment)**

1. Place the reels in the L size position.
2. Push the iron core of M-Stopper Solenoid by hand.
3. Observe the clearance (A) between Mech Chassis and M-Stopper as shown in Figure 6-18-2. And make sure that it is within 1.1 to 1.3mm.
4. If not, loosen the 2 screws (A), which fixed M-Stopper Solenoid. And adjust the position of M-Stopper Solenoid so that the clearance (A) is within specification. And tighten the 2 screws (A).

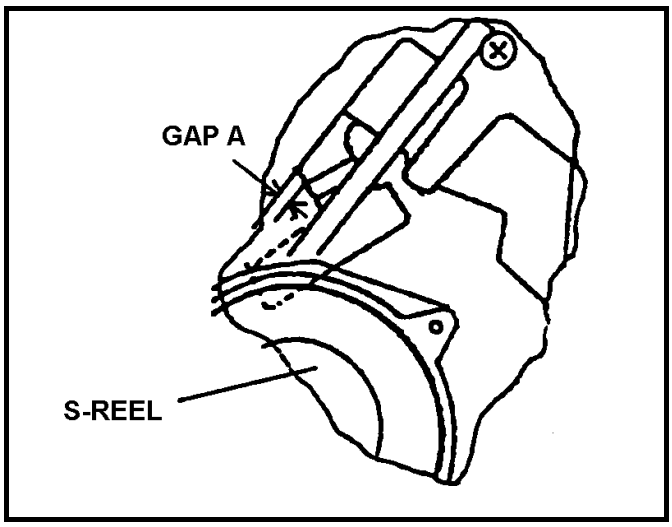



Fig.6-18-2 M-Stopper Solenoid Position Adjustment

## 6-19. Distinction SW Unit Replacement

**(Removal)**

1. Remove the Top Case Unit.
2. Remove the Front Loading Unit.
3. Remove the Bottom Case Unit.
4. Open the P.C.Board Unit and remove the Shield Plate.
5. Disconnect the connector P17 on Servo P.C.Board.
6. Unscrew the 3 screws (A) and remove the Distinction SW Unit as shown in Figure 6-19-1.

**(Installation)**

1. Install the new Distinction Switch Unit follow the removal steps in reverse order.
2. Confirm that the M and L cassettes touch to Distinction Switch Unit correctly.

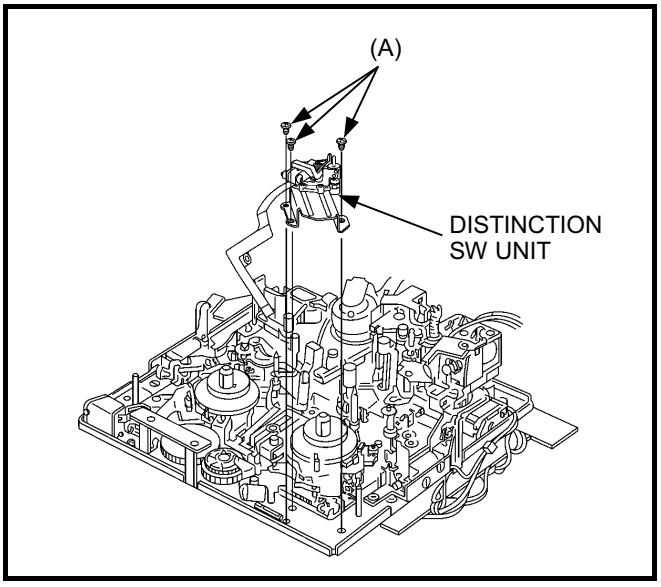



Fig. 6-19-1 Removal of Distinction Switch Unit

## 6-20. Reel Drive Motor Unit Replacement

**(Removal)**

1. Remove the Top Cover.
2. Remove the Front Loading Unit.
3. Disconnect the connector P16 on the Mech I/F P.C.Board. as shown in Figure 6-3-1.
4. Unscrew the 2 screws (A) and remove the Reel Drive Sensor P.C.Board as shown in Figure 6-19-1.
5. Unscrew the 2 screws (B) and remove the Reel Drive Motor Unit as shown in Figure 6-20-1.

**(Installation)**

Install the new Reel Drive Motor Unit follow the removal step in reverse order.

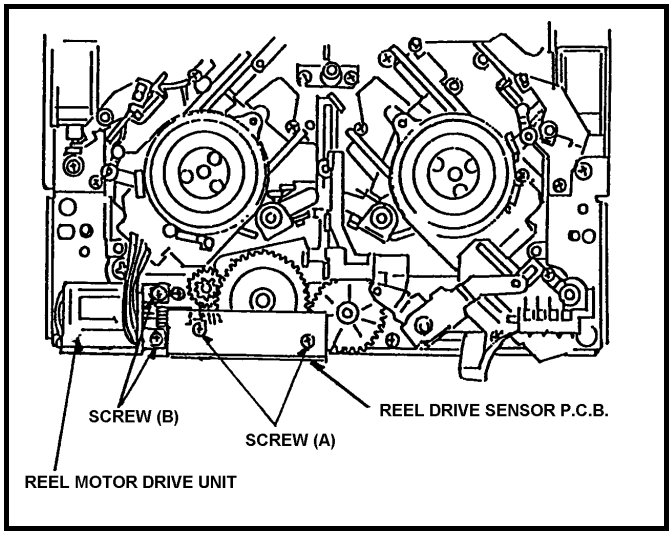



Fig.6-20-1 Removal of Reel Drive Motor Unit

## 6-21. L-M Release Angle Unit Replacement

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Unscrew the 2 screws (A) and remove the L-M Release Angle Unit as shown in Figure 6-21-1.

**(Installation)**

1. Install the new L-M Release Angle Unit follow the removal steps reverse order.

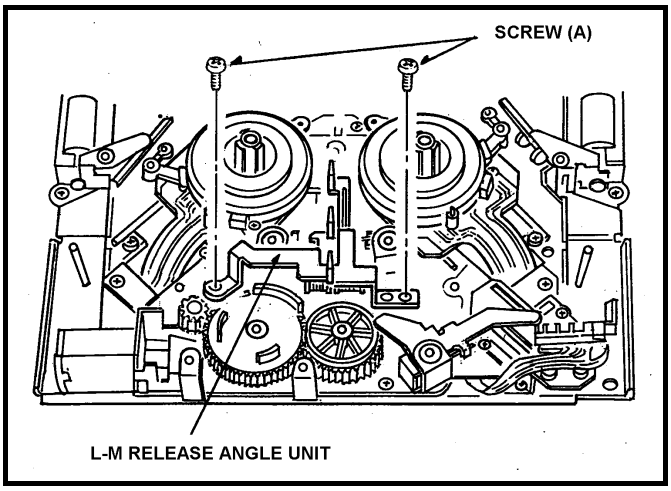



Fig.6-21-1 Removal of L-M Release Angle Unit

## 6-22.Slide Rod Unit Replacement and Adjustment

**(Removal)**

1. Remove the Top Panel.
2. Remove the Front Loading Unit.
3. Remove the L-M Release Angle Unit. (Refer to item 6-21).
4. Remove the Reel Drive Sensor P.C.Board (Refer to item 6-20).
5. Remove the Cut Washer (A) and remove the Reel Drive Cam Gear.
6. Remove the Cut Washer (B) and remove the MIC Drive Arm Unit.
7. Remove the Cut Washer (C) and remove the MIC Geneva Gear.
8. Remove the Cut Washer (D) and remove the Reel Drive Arm Unit as shown in Figure 6-22-2.
9. Remove the Supply and Take Up Reel Rotor Unit (Refer to item 6-3).
10. Remove the 2 Cut Washers (E) and remove the Supply and Take Up Base Drive Arm Unit.
11. Remove the 2 Cut Washers (F) and remove the Slide Rod Unit.

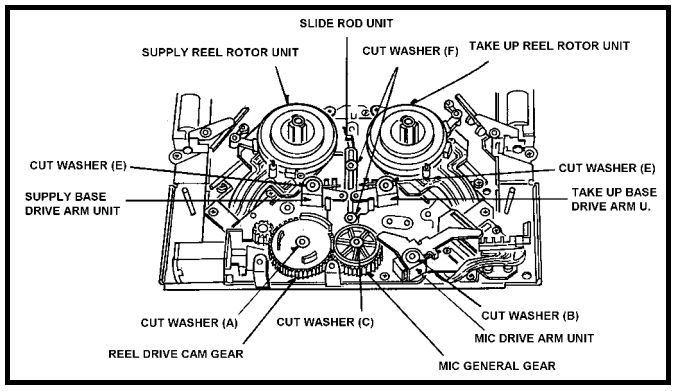



Fig.6-22-1 Removal of Slide Rod Unit

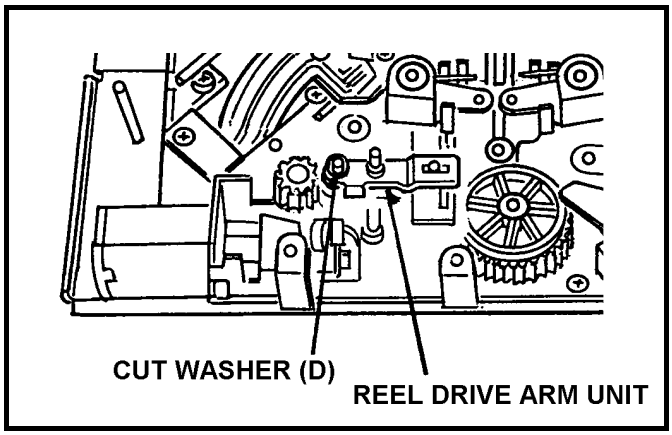



Fig.6-22-2 Removal of Reel Drive Arm Unit

**(Installation)**

1. Install the new Slide Rod Unit follow the removal steps in reverse order.
2. When install the Reel Drive Cam Gear and MIC Geneva Gear, then phase adjustment should be performed as follows.

**(Adjustment)**

1. Install the MIC Geneva Gear to the Chassis.
2. Place the Reels in the M-Size position by hand.
3. Install the MIC Drive Arm Unit.
4. Place the REC Inhibit SW in front position on Distinction SW Unit by rotation of MIC Geneva Gear, and then MIC Geneva Gear should be positioned as shown in Figure 6-22-2.

**Note:** Protrusion of MIC DRIVE Arm Unit is positioned as shown in Figure 6-22-2.

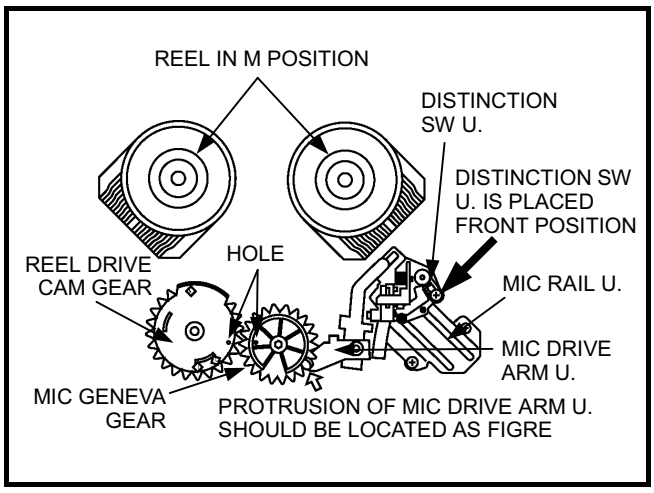

REEL IN M POSITION
DISTINCTION SW U.
DISTINCTION SW U. IS PLACED FRONT POSITION
HOLE
REEL DRIVE CAM GEAR
MIC RAIL U.
MIC DRIVE ARM U.
MIC GENEVA GEAR
PROTRUSION OF MIC DRIVE ARM U. SHOULD BE LOCATED AS FIGRE

Fig.6-22-3 Gear Phase Adjustment

5. Install the Reel Drive Cam Gear and hole of Reel Drive Cam Gear should be matched with the hole of MIC Geneva Gear as shown in Figure 6-22-3.
6. Install the Cut Washer (A), (B) and (C) as shown in Figure 6-22-1.

※Point of Adjustment

1) Reel in M-Seze position.
2) Set the REC Inhibit SW in front position of Distinction SW Unit..
3) Portrusion of MIC Drive Arm Unit is positioned as shown in Figure 6-22-3.
4) Holes between Reel Drive Cam Gear and MIC Geneva Gear are matched.

## 6-23. T4 Post Phase Adjustment

1. Place unit into unloading condition.
2. Confirm that the hole (B) of T4 connection Gear was matched to hole of T4 post as shown in figure 6-23-1.
3. Confirm that the portion ( C ) of T4 connection Gear and hole (A) , which are located as shown in figure 6-23-1.
4. If not, adjust the phase of T4 post follow the above procedure.

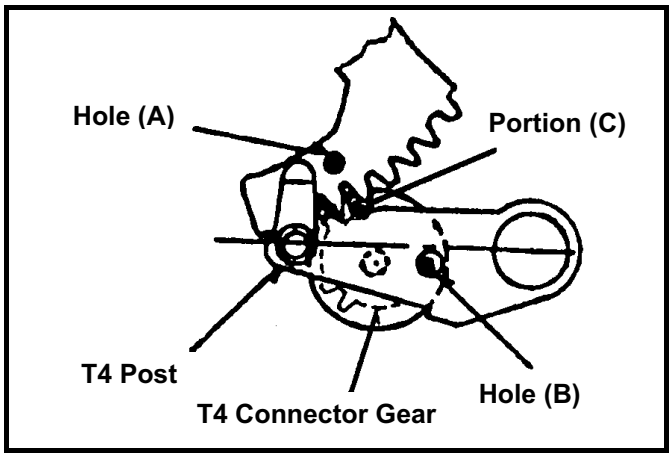



Fig.6-23-1 Phase of T4 Post

## 6-24. Thrust Adjustment Screw Replacement and Adjustment

1. Remove the Thrust Adjustment Screw.
2. Enforce cleaning of point department of capstan shaft with an applicator.
3. Put the oil(VFK0906) on a new Thrust Adjustment Screw and install the upper end of the Capstan Housing.
4. Turn the Thrust Adjustment Screw slowly to counter-clockwise until the Capstan Rotor just starts turning (separate from the Capstan Rotor).
5. Turn the Trust Adjustment Screw an another angle of 270° from 180° (about 225° ) clockwise as shown in Fig. 6-24-2.
6. Put the glue (Ex:: Three Bond 1401B) on the Thrust Adjust Screw.
7. Confirm whether the Oil Seal does not come in contact with the Capstan Housing.

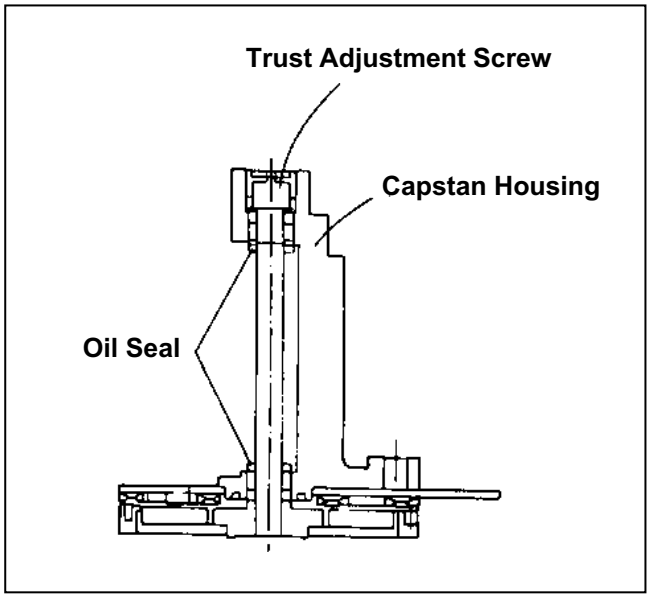



Fig.6-24-1 Removal of Trust Adjustment Screw

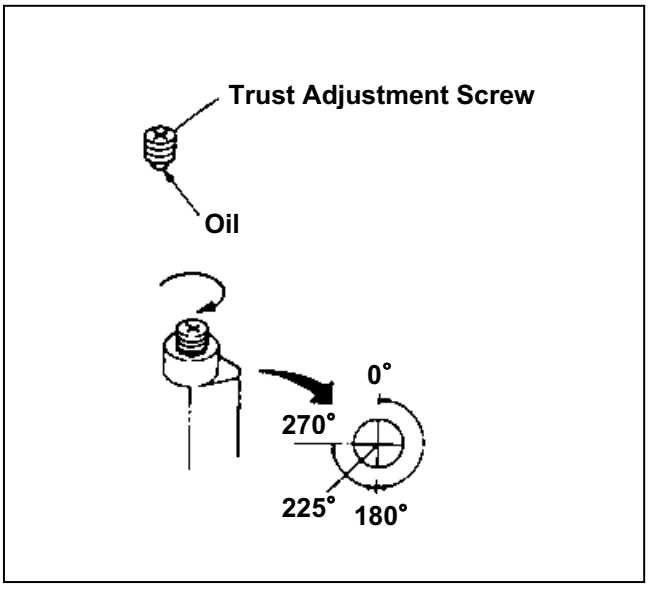



Fig.6-24-2 Adjustment of Thrust Adjustment Screw